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AUTHOR	Hamilton, Jack A.
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ABSTRACT

The purpose of this monograph is to aid practitioners in gaining federal Joint Dissemination Review Panel (JDRP) approval of career education projects. It helps them understand the importance of designing and implementing a sound evaluation from the early stages of the program, alerts them to common errors or omissions that weaken or destroy conclusions that can be drawn from the evaluation results and shows how to avoid them, and explains administrative procedures involved in obtaining JDRP approval. Section 1, on the benefits of JDRP approval, discusses structure of the National Diffusion Network (NDN) and JDRP, problems in career education evaluation, and overcoming those problems. Section 2 contains a checklist giving essential points for local career educators to consider in planning evaluation designs. Each item is discussed. Section 3 provides specific recommendations for the local career educator regarding the preparation and submission of an evaluation report to the JDRP. In section 4 are common questions asked by educators and the answers typically given. Appendixes contain the JDRP submission format, three sample JDRP submissions, and a list of references. Each sample is the exact ten-page report submitted and approved by a unanimous or nearly unanimous vote of the panel. (YLB)

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HOW TO GET JDRP APPROVAL OF CAREER EDUCATION ACTIVITIES

by

Jack A. Hamilton
American Institutes for Research

CE 026 490

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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Introduction

Jean Worth is the director of a career education project that has had several years of implementation. She believes that the project is sound, having completed an extensive evaluation to demonstrate its effectiveness. With the evaluation data in hand, she decides to try for approval by the federal Joint Dissemination Review Panel (JDRP). It isn't the end of the world to go for it, so why not? Moreover, her school principal and district superintendent encourage her to make the effort. Jean and her hard-working staff would appreciate the honor of national recognition as an exemplary career education activity. Not only that, it would also open the door to entry into the National Diffusion Network (NDN). Once in the NDN, others (students and teachers) across the country could benefit from all the work Jean and her staff have done.

Understanding that before she can submit the required 10-page summary report on the effectiveness of her project to the JDRP, she must get the proposal sponsored by a federal education program, Jean takes pen in hand. It doesn't take long before she realizes what a chore it is to pull together even a first draft of the submission. Long before this Jean had had her staff score the data collection instruments, tabulate the data, and analyze them. It had been an arduous task, but tables of results are finally ready for her to insert into the evaluation report. Tables, yes! The harder part, though, has fallen to Jean--writing the narrative that would explain to the reader the meaning of all the tabled data, not to mention the administrative and instructional procedures used in the project, its costs, origins, demographic characteristics, etc.

At long last (and after much sweat) Jean has a rough draft of the report ready, and she mails a copy of it off first to the state career education coordinator, as required by U.S.O.E.'s Office of Career Education (OCE). Jean understands that the coordinator will have a member of her staff with expertise

in evaluation review the draft, and that a written summary of the review will eventually be mailed back to her. Jean is hoping that this review will be brief, if not perfunctory, so that she can get on with the business of submitting a final draft to the federal Office of Career Education. She also understands that program officials at OCE are responsible for conducting a detailed review of the submission before it is approved and forwarded by them to the JDRP.

It was in this frame of mind that Jean later opened an envelope from the state career education coordinator and read the following letter, which the coordinator had forwarded to her:

Dear Ms. Worth:

My staff and I have gone over your draft JDRP submission, and I would like to offer you the following comments. While you have planned your evaluation reasonably well, you have allowed inaccuracies or inconsistencies of one kind or another to be introduced that have clouded the results. We have several areas of concern:

Selection of Evaluation Sample: You used a treatment/control group design, but you failed to establish the comparability of the groups. Specifically, a bias was introduced when you used volunteers for the treatment sample. In addition, you failed to account for the greater number of dropouts from the treatment group when compared with the control group.

Selection/Development of Instruments: You made a good defense for your decision not to use standarized tests, arguing that available instruments addressed your activity's objectives only peripherally. However, the instruments you developed and used locally were not supported by satisfactory evidence of reliability and validity.

Inferring that the Treatment Caused the Gains: Inferring that gains made by the target population were due to the treatment, without ruling out the possibility of other reasons for the gains, is another concern. Your selection of control groups did not rule out the possibility that intervening variables such as parallel programs in the school or community could have influenced the results demonstrated by testing.

If you would like to call or write me, I would be happy to elaborate on these and other less critical areas of concern in your draft submission.

Sincerely,

B. Sharp
Evaluation Consultant

After picking herself up off the floor, Jean really unloaded her feelings on that state department consultant who had the gall to react to her draft like that. What right did he have to criticize Jean's efforts when he had no first-hand information about her project at all! He was just wasting a lot of the taxpayers' money. After she cooled down somewhat, Jean supposed that it probably would be worth the price of a phone call to find out if there was any hope at all of correcting the problems noted in the letter.

WORTH: Hello, Dr. Sharp. This is Jean Worth, and I have just received your letter in which you critiqued our draft JDRP submission. I'd like to know more about what you think we could do to strengthen our evaluation data.

SHARP: Jean, I'm afraid that I can't be very encouraging. Your best bet would have been to select the groups randomly from total populations, or at least to have established the relevant variables and located samples matched on those variables. And with your excessive number of dropouts from the treatment group, it would have been better to have limited the analysis to those who participated in both pre- and post-measurement, provided that attrition did not result in systematic bias between the treatment and control groups.

WORTH: Well, Dr. Sharp, that's easier said than done. There's not much that I can do about those decisions now. What about the problems you saw with the instruments we developed?

SHARP: To document the validity of your instruments, Jean, you need to show that outside experts or studies confirmed a set of specifications that your instruments had to meet, and that items were written expressly to test for attainment of the instructional objectives of your project materials. A systematic reliability study would also be necessary to report, for example, data establishing the test-retest reliability of the instruments.

WORTH: You're very discouraging, Dr. Sharp. What do you expect me to do, start all over again?

SHARP: I'm sorry to have to be so discouraging, Jean, but there's no way that your present draft will be approved by the JDRP. You'd best go back to the drawing board and collect some

more data based on a better evaluation design.

Jean hung up the phone and slumped backward in her chair. Her project funds were almost expended. There was no time or money to begin anew with a more comprehensive field test of the project. Jean's vision of JDRP approval for the project and eventual funding for national dissemination had been aborted, despite her strong belief in the effectiveness of the project. Jean's final disgruntled comments went something like this: "Who needs all this pain? I sure don't. The JDRP can get along just fine without our project. Though it just about killed me writing it, the best place for this draft submission is File Thirteen--Forget it!!"

The purpose of this monograph is to help local project directors and state career education coordinators avoid the above disaster by: (1) helping you, the practitioner, understand the importance of designing and implementing a sound evaluation from the early stages of your program; (2) alerting you to common errors or omissions that weaken or destroy conclusions that can be drawn from the evaluation results, and showing you how these can be avoided; and (3) explaining in step-by-step detail the administrative procedures involved in obtaining JDRP approval of your career education project.

Why Go For JDRP Approval?

The Career Education Incentive Act (PL95-207) is providing approximately 20 million dollars per year to state educational agencies which, in turn, award about 85% of that money in grants to local educational agencies to enable them to implement career education activities. Local school districts are encouraged to plan and carry out carefully designed evaluations of the local project activities. Some of these local evaluations may produce convincing evidence of the effectiveness of the career education activities

that are being conducted, providing the basis for their consideration by the Joint Dissemination Review Panel (JDRP). Those projects that are approved as exemplary by the JDRP can then be disseminated for replication by other local school districts.

The Vision

Projects with the potential of becoming exemplary, such as career education projects supported with Incentive Act funds, may develop programs which later can be adopted or adapted by other school systems. An implied responsibility of potentially exemplary programs is to provide potential users with sound bases for deciding whether to try them in their own school systems. That is, a school administrator in New York should be able to predict whether a program developed in California will work in his or her school on the basis of the California program's evaluation results. Career education evaluations should include both process and outcome data so that it is possible to make reliable predictions from one program implementation to another. This includes a good description of the treatment(s) applied, thus facilitating the process of transporting successful components from one site to other sites.

The vision of U.S.O.E.'s Office of Career Education, the agency responsible for administering the Incentive Act funds, was presented by the OCE Director, Dr. Kenneth Hoyt, at a 1978 meeting of the National and State Advisory Councils for Career Education:

> Even at this relatively early stage, it does not seem unreasonable to consider a strategy that calls for identifying at least one school system in each State whose career education efforts produce evaluation data that could be submitted to HEW's Joint Dissemination Review Panel (JDRP) for approval and subsequent insertion into the National Diffusion Network (NDN). This is an important strategy for two basic reasons: (a) it will result in

wide national publicity for career education efforts that have proven themselves to be effective; and (b) other school systems can, in later years, use ESEA funds for adopting models of career education in the NDN network long after the brief five-year life of Public Law 95-207 has ended.[1]

To implement this strategy, state career education coordinators will need to assume a leadership role in identifying outstanding local career education projects. This will include encouraging and assisting such projects in preparing submissions to the JDRP, and then helping the projects that are approved by the JDRP to develop proposals for submission to the NDN in order that they can obtain funding to serve as developer/demonstrator projects in the NDN.

NDN/JDRP: Who and What Are They?

At this point, you might be asking: Why all this emphasis on the NDN and the JDRP? Will they do for career education all that OCE is hoping that they will do? Of course, there is no guarantee; but, let's look at the record and the promise.

NDN structure. The NDN is a nationwide system established to assist local school districts and other educators in improving their educational programs through the adoption or adaptation of already developed, rigorously evaluated, exemplary educational programs and practices. Begun in fiscal year 1974 by the U.S. Office of Education (U.S.O.E.), the NDN has two main purposes:

- To build and maintain a national system for delivering an increasing variety of

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[1]The NDN already has a number of JDRP-approved career education-related programs and practices.

successful educational projects to meet the needs of local school districts at a fraction of the original development cost.

- To assure that successful educational projects developed in one state are made available for consideration by school districts in all states.

To carry out these purposes, U.S.O.E.'s Division of Educational Replication contracts with two different groups: Developer/Demonstrators (D/Ds) and State Facilitators (SFs).

D/D projects are directed by local school staff members who have developed over a period of several years (often with the help of federal funds) an exemplary approach for handling a specific school need. Before being admitted into the network as a D/D, the project must have been approved by the Joint Dissemination Review Panel (JDRP). As of April 1980, 245 local projects had received approval to disseminate from the JDRP, representing over 57% of those originally seeking approval. Of the 245 JDRP-approved projects, 138 are receiving dissemination funds as D/Ds. Their primary job is to secure the adoption of their programs in other states. At least 50 percent of the potential adoptions they obtain annually must take place in a state other than their own.

NDN Facilitators, the other group funded by USOE to carry out NDN activities, are primarily responsible for helping school districts in their own state or region adopt or adapt the exemplary projects that have been developed in other states and approved by the JDRP. They are also encouraged to promote exemplary projects that have been developed within their own state.

One of the biggest accomplishments of the NDN is its record of cost-effectiveness. The federal government's investment to develop the 138 NDN projects totals almost $66 million, with the median cost being

$248,642. These projects are being installed in local school districts through the NDN at a cost to the federal government of approximately $4,000 to $5,000 each. The median per-pupil cost to a school district to adopt an NDN project is $12. This effective dissemination of quality programs also helps to do away with the all too prevalent and wasteful "reinvention of the wheel" every time an educator has a problem requiring resolution.

The director of U.S.O.E.'s Office of Evaluation and Dissemination (OED), which is responsible for the NDN, stated his vision for the expansion of career education programs in the NDN at a 1979 NDN Conference.

> Enlarge and broaden the repository of tested practices and methods. Postsecondary options are needed to move beyond the early childhood and K-12 range, plus there is a need for additional programs in special education, vocational education, and career education.

JDRP structure. The NDN is a federally sponsored approach to spreading exemplary education programs and practices throughout the nation. The validation mechanism for the identification of programs to be included in the NDN is the JDRP. Basically, the JDRP reviews programs and products proposed for dissemination by federal education programs to ensure that claims of effectiveness are backed by sound evidence. Its basic purpose is to provide a quality control mechanism of federal education dissemination activities. The JDRP is not a component of the NDN. However, only programs approved by the JDRP are eligible to receive Developer/Demonstrator grants through the NDN. Ultimately, then, the JDRP functions as a clearinghouse, a legitimizing agency, an indicator of federal educational priorities, a quality control mechanism, and a target criterion for program developers.

The JDRP was established in 1972 by the Education Division of the Department of Health, Education, and

Welfare. The panel has 22 members, eleven staff from the U.S. Office of Education and the same number from the National Institute of Education, appointed respectively by the Commissioner of Education and the Director of NIE. Panelists are selected on the basis of their ability to analyze and understand evidence of effectiveness. Panelists are, of course, expected to base their decisions on personally unbiased and methodologically sound judgments.

JDRP review seeks to set standards of effectiveness and documentation for educational products and programs. Before NDN support can be provided for dissemination, suitable evidence must be provided to convince the panel members that each of these questions has been answered:

- Is there evidence that something happened?
- Is the evidence credible?
- Did something happen often enough that effects as large as those observed would be likely to happen again?
- Did something happen big enough that the effects are educationally significant?
- Did the something which happened often enough and big enough also occur under circumstances that are likely to be reproducible?
- Can what happened be attributed to the treatment?

With these criteria, the JDRP has tried first to define effectiveness and second to encourage use of professional judgment. The emphasis is on persuasive or compelling evidence rather than rigid cutoffs. The Panel seeks reasonable evidence on the criteria, not perfection. Programs may be approved for which evidence on one or another criterion is not particularly strong, if the evidence as a whole seems

convincing that the program is likely to benefit others if carefully adopted or adapted.

To some educators, JDRP standards are unrealistically high, particularly in the areas of educational significance, attribution of measured effects, and reproducibility. To others, JDRP standards are too low or not applied with sufficient exactitude, particularly in the areas of statistical reliability, credibility of the data, and magnitude and attribution of effects. The panel tries to strike a middle ground between weak standards and unachievable rigor. Probably the best way to assess the JDRP's procedures is to read the detailed notes of sessions recorded since January 1976. If you have an opportunity, attend some JDRP sessions, which are open to the public.

Problems in Career Education Evaluation

The federally sponsored dissemination vehicle--the NDN and the JDRP--is firmly established, and the vision of widespread dissemination of proven career education activities is of public record. The next questions are: What is the state of the art in career education evaluation? What is the baseline practice, so to speak?

In 1977, the U.S. Office of Education contracted with the American Institutes for Research (AIR) to examine the effectiveness of career education by identifying the "best of the current career education programs and practices" (as called for by Public Law 93-380). Each career education activity had to furnish objective evidence of effectiveness based on significant differences in measured achievement between activity participants and an appropriate comparison group or standard. Suitable evidence meant that each of these criteria had been met or exceeded:

- The intended positive effects of the product or program were achieved, without appreciable negative side effects.

- The positive effects were measured reliably and validly and the obtained measurements were not explainable by chance.
- There is tangible evidence that the product or program actually caused the measured effects.
- The magnitude of the measured effects is educationally significant.
- The available evidence is presented in a thorough, easily interpretable, and plausible manner.
- There is a reasonable chance that the positive effects can be reproduced elsewhere.

If some activities could be identified as well-evaluated and ultimately approved for dissemination, they could serve as guides for school districts seeking to adopt or adapt effective career education activities.

In addition to a search of published and nonpublished reports, AIR sought nominations of evaluated career education activities from knowledgeable people in the field. In all, 394 activities were nominated. Evaluation reports were obtained from 257 of these activities and screened according to stringent criteria. Following this nationwide search, ten career education activities were recommended for the JDRP's consideration by AIR staff and the U.S.O.E. Project Officer. Ultimately, seven of the ten career education activities were approved for dissemination by the panel and authorized to apply for federal funding support, and two of the remaining three activities were viewed as having strong potential for approval if more conclusive evidence of activity impact was provided.

A key finding of this national search for exemplary programs was that the probability of finding

career education projects with acceptable evidence of effectiveness is very small, and that this poses a serious obstacle to the dissemination of career education activities. Are good programs really lacking, or are there simply too many problems inherent in evaluating a developing area such as career education?

In AIR's study, the most common reasons for rejecting the evaluation design or data from a career education activity were: the lack of testing for statistical significance of student outcome data; problems in the evaluation designs including either the lack of a comparison group or standard, or flaws with the manner in which the comparison groups were formed; and faulty data collection instruments or procedures that could have resulted in error or bias. Most of the problems found in the activity evaluations could have been avoided.

Measurement of career education outcomes is a major and widely recognized problem. In the past, program funds frequently have purchased audits, process reports, consumer satisfaction surveys, and, less frequently, outcome evaluations. Few funds have been spent on outcome evaluations, and the quality of outcome evaluations when they have been funded has often been low. One interpretation is that most evaluators are convinced that outcome-oriented evaluation should not be attempted until the program is well-implemented, but time runs out. Another reason might be that most evaluators, as employees of the program director, have almost no power to insist on the essential elements of an outcome-oriented evaluation. It is also true in some instances that resources have been limited, particularly for the extensive field testing necessary.

High quality instruments for measuring outcomes are not yet generally available, because demand is so recent. Often, local test development is the only reasonable approach for measuring the unique content and objectives involved. However, failure to specify the performance indicators acceptable as evidence of

achievement of the program objectives typically leads to unsuccessful use of local tests.

Standardized tests can be considered for measurement of career education outcomes only if certain conditions are met. Sufficient linkage between the instructional program objectives and the content and skills sampled by the instruments is critical. Unless this condition is observed, the results obtained will be of very little value.

Surmounting the Problems

How might these roadblocks to measuring career education outcomes be overcome? One alternative would be for the JDRP to establish a second level of acceptability, such as "promising practices." However, the panelists are concerned that the meaning and clarity of different levels of approval would become blurred, with the result that everything approved by the JDRP at whatever level would be seen as essentially similar. The distinction between "promising" and "supported by evidence of effectiveness" would quickly be lost. Present U.S. Office of Education policy allows the distribution of descriptive catalogs and listings of projects and materials of unknown effectiveness only if claims or laudatory statements are avoided. This policy is aimed at safeguarding the right of potential adopters to expect that programs recommended by the federal government have something substantial supporting them in the way of evidence of effectiveness.

A more creative and desirable alternative is to expand, upgrade, and support local career education program evaluations. Here are some specific recommendations:

1. *Since some of the best career education programs do not have the opportunity to go through the JDRP review because funding provisions for planning and implementing outcome evaluations are lacking, the level of effort that goes into planning appropriate*

designs for evaluating instructional programs and products in career education should be increased.

The Career Education Incentive Act recognizes the need for adequate program evaluations. The Incentive Act requires that annual state plans "provide proposed criteria to the Commissioner for the evaluation of the extent to which the State will achieve the objectives set out in the State plan." Although the Incentive Act does not require specific funds to be set aside for the support of local school system personnel who would be responsible for evaluation planning and implementation, it does specify that federal funds may be used to "provide State leadership for career education, either directly or through arrangements with public agencies and private organizations (including institutions of higher education), in...conducting needs assessments and evaluations." The state plan mechanism could be used to ensure that an increased level of effort is applied to evaluation of career education activities supported with Incentive Act funds.

2. *Technical assistance should be made available to local career educators at the time of proposal writing so that an evaluation design reviewed by experts can be included in their proposals.*

If an appropriate evaluation design is not a part of the original project proposal, it is unlikely that necessary evaluation planning and implementation will be carried out once the project is funded. Such technical assistance could be supported by either local or state agencies that solicit career education proposals, or possibly by technical assistance clearinghouses such as the OCE-funded Northwest Connection or those maintained by the National Diffusion Network (the primary one is the Technical Assistance Base, consisting of five regional service units that match persons or agencies providing technical services with present or potential NDN-funded projects needing services).

3. *To provide local career educators with some tools to carry out evaluations acceptable to the JDRP, a few generic career education evaluation models should be field tested with actual career education activities.*

One of the products of the AIR study of well-evaluated career education activities is an evaluation handbook that was developed to encourage local career educators to apply sound evaluation models to their efforts.[1] The handbook contains models for evaluating: (1) curriculum infusion; (2) staff development; (3) product development; (4) facilities; (5) supplementary activities; and (6) indirect interventions. Each model includes the steps necessary to avoid those problems that AIR found characterized local evaluations of similar activities. By focusing on ways to avoid the problems, the writers hoped to encourage local practitioners to adopt or adapt applicable models to evaluate their career education activities. Local career educators are urged to build one of the evaluation models into future project proposals, and to report to the Office of Career Education their experiences in field testing the models.

4. *Career education evaluation designs should place greater emphasis on non-test evidence of effects.*

More attention could be given to evidence of effectiveness that includes unobtrusive measures. One of the best JDRP submissions in recent years came from 10-year, 10-school trend data on number of suspensions and expulsions. These data showed that the treatment school had large decreases where previously there had

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[1]Under a U.S.O.E.-approved publishing agreement, Olympus Publishing Company of Salt Lake City, Utah is distributing this handbook at a minimal cost. It is referenced in Appendix C.

been a trend upward and where comparison schools showed no decrease, although they were comparable in other ways. Other strong JDRP submissions have used school retention rates, school completion rates, and rates of placement in entry-level jobs.

5. *Career education evaluation designs should place greater emphasis on intermediaries as well as on students.*

There are many innovations that are intermediary to student progress that could be submitted to the JDRP. For example, changes in teacher skills, knowledge, and attitudes are particularly relevant for career education. Increases in academic learning time as a variable associated with improved teacher management of time as a learning resource could be convincing. Innovations that improve the efficiency or effectiveness of use of school funds could be submitted.

Specific Help for the Local Career Educator

In this monograph, a checklist giving some essential points for local career educators to consider in planning their evaluation designs will be discussed in detail, with full opportunity for readers to use the list to assess an existing design as well. Although a post hoc assessment has many limitations, as was found in the AIR study, there are usually some possibilities for improving designs or for reanalyzing the outcome data. Following the presentation of the checklist, specific recommendations will be given to the local career educator regarding the preparation and submission of an evaluation report to the JDRP. Much has been learned from the AIR study; these findings will be laid out in a step-by-step approach. The federal government is irresponsible if it does not take steps to ensure that the educational materials it disseminates are backed by objective evidence of effectiveness; the joint USOE/NIE panel ensures that the same criteria for judging evidence of effectiveness prior to federal dissemination are applied to all submissions.

Once the complete process involved in going before the JDRP is spelled out, you will be able to go on to a section containing common questions asked by your colleagues in the field and the answers typically given to such questions. Finally, an appendix contains three samples of JDRP submissions from the AIR study. Each sample is the exact 10-page report submitted to the JDRP by a particular career education project director. In all three instances, the submissions were approved by a unanimous or nearly unanimous vote of the panel. The last section of the appendix includes a list of additional references likely to be of use to the reader.

Career Education Program Evaluation Checklist

For a career education activity to be regarded as effective, the JDRP requires that there be sound evidence that it was, in fact, responsible for the observed change in the participants. Evaluation should be a continuous and ongoing aspect of any project, with a key being the value of both process and outcome evaluation as an aid to management decisionmaking. Further, an evaluation design which is directly related to the project's stated objectives should be established early and baseline data should be obtained prior to, or at least concurrent with, initiating the delivery of services. The checklist below gives essential points for local career educators to consider in planning their evaluation designs.

Topics	Questions
TREATMENT	
Needs	1. Are the needs the treatment is designed to fulfill important?
	2. Are the needs defined in terms of required changes in the way people think, feel, or act?

Topics	Questions
TREATMENT (cont.)	
Objectives	3. Do the desired outcomes of the treatment relate to its needs? Is there a reasonable chance that if the outcomes are attained, the needs will be met?
	4. Are the desired outcomes of the treatment appropriate for its intended audience and circumstances of use?
	5. Are the desired outcomes either explicitly stated or clearly implied?
Procedures	6. Do treatment procedures represent an implementation of the treatment objectives?
	7. Are the procedures likely to produce the desired outcomes under the intended circumstances of use?
	8. Are the procedures directed at career education outcomes distinct and not confounded with non-treatment components?
	9. Are there likely to be no unintended side effects, particularly undesirable ones?
	10. Are the effects of the procedures measurable in the short run? If not, can suitable proxy measures be developed?
	11. Can the procedures be implemented within practical time and resource constraints?

Topics	Questions
TREATMENT (cont.)	
	12. Are the procedures consistently employed by staff responsible for instruction?
	13. Are the details of instructional procedures available to provide adequate descriptions of treatment methodology?
EVALUATION	
Evaluation Design	14. Are adequate descriptive data characterizing the treatment group provided?
	15. Are adequate descriptive data characterizing the comparison group provided?
	16. Are procedures for selecting the comparison group specified?
	17. Is the comparison group reasonably comparable to the treatment group?
	18. Does the comparison group use typical instructional materials and procedures?
Measures	19. Are the measurement instruments either standardized tests or specially constructed tests with reasonable and verifiable validity and reliability?
	20. Are the measurement instruments appropriate for evaluating the desired outcomes?

Topics	Questions
EVALUATION (cont.)	
Schedule	21. Are the instruments administered to treatment and comparison groups according to the same schedule and under the same conditions?
Data Processing	22. Are the classification and grouping of raw data for processing appropriate for the methods of statistical analysis used?
Statistics	23. Are the statistical analyses used appropriate for the evaluation design?
Results	24. Is a discussion of the meaning of the results provided?
	25. Is a plausible interpretation of the reason for the results given?
Educational Significance of Results	26. If the difference in performance of the treatment group is statistically significant in comparison with an appropriate comparison group or standard, has the educational significance of this difference been explained?
Consistency of Results	27. Do the evaluation data give promise of replication, or are they verified by data from adequate replication(s) of the treatment?

Explanation of Checklist Items

Needs, objectives, procedures. Evaluation reports submitted to the JDRP are expected to provide an adequate description of treatment procedures. Such information is necessary for potential adopters to decide whether to try out the program in their school districts based on an adequate understanding of the career education

program and the factors responsible for its successful operation. Information should include the program's conceptual framework and methodology for identifying priority needs, its major goals and objectives, its instructional procedures, and its management plan. Information about the number of students involved, their ages, grades, and other relevant demographic characteristics is also required. Information on teachers includes relevant aspects of their training, qualifications, and experience. Information on the context includes demographic characteristics of the locale, relevant aspects of the school system (e.g., size and financial status), and the historical background of the program. It is also necessary that program materials be available for dissemination. An adequate description of the treatment implementation helps future users to implement the program properly.

Since financial considerations are key issues for school districts planning adoption, it is necessary to include cost information. Although differences in total costs and in cost categories exist among programs and locations, it is still important to provide accurate start-up and recurring budget guidelines for administrative, clerical, teacher, and teacher-aide salaries, materials, equipment, facilities, consultants, services, travel, testing, and evaluation. Total per-student costs must be presented so that any add-on costs for adopting the career education program are clear.

Evaluation design. A good evaluation design must be able to support strong inferences, particularly regarding assertions that the treatment as implemented caused the effects measured, and that the participants are a representative sample of the entire defined audience. In principle, the design best supporting strong inferences is one in which two subsamples of participants are randomly selected: one subsample (the treatment group) participates in the career education implementation; the other (the control or comparison group) does not. In addition, outcome measures are administered both before (pretest)

and after (posttest) the treatment is implemented. The performance of the comparison group is used to indicate what the participants' scores would have been without having been exposed to the treatment.

In practice, it is rarely possible to use this randomized pretest-posttest control group design. There are various reasons for this. There may not be enough persons available to construct two groups. It may not be possible to collect all the needed data from the nonparticipants, who have no incentive to participate in the evaluation. Under such circumstances, compromises are necessary. For example, the project director often will have to use a nonrandomly selected group of nonparticipants, chosen by their willingness to cooperate. If so, an effort should be made to provide evidence (by comparing the pretest performance of the two groups) that the two groups are not inherently different. Remember, the strength of the inference depends directly on the strength of the evidence provided.

Other appropriate comparison groups or standards include: (1) national norm groups; (2) local norm groups (norms for locally developed tests); (3) trend data; (4) experimental expectancy (gains of the treatment group are compared with expected gains as indicated by research); (5) time-series samples; and (6) alternative treatment groups (several treatments administered, with the possibility of a control/no-treatment group used also).

The strength of the inference is also directly related to the number of persons involved in the study. The more participants, the greater the chances of detecting real differences between treatment and comparison groups and the more generalizable the results. However, it is often difficult to involve large samples in the treatment implementation and in the comparison groups. Thus, in general, 25-40 persons per group are probably adequate. If a number of persons drop out after the pretest, the pretest scores of the dropouts and non-dropouts should be compared to ensure that no significant factors (e.g., ability level) caused the attrition. Program effec-

tiveness should be measured only on the basis of those who took both pre- and posttests.

Measures. Although the problem of selecting an adequate evaluation instrument is common to all kinds of educational evaluations, it is especially critical in the area of career education evaluation. The difficulty in identifying appropriate instruments to measure career education outcomes is the most frequently mentioned problem in career education evaluation. The issue facing local career educators is to determine whether valid and reliable instruments are available to measure participant change, so that data can be trusted. Measures are acceptable if they are either standardized tests or locally constructed tests with reasonable, verifiable validity and reliability data.

With regard to locally developed measures, the major steps to follow are to: (1) select the types of instruments needed to measure the outcomes identified; (2) draft appropriate measures; (3) try out the drafted items on a small group of students similar in characteristics to the target group (a mini-pilot test); and finally (4) revise and refine the measures. All measurement techniques have some drawbacks in all of the following criteria; what is important in designing measures is to maximize the levels of adequacy. Let's discuss how to accomplish this.

- Objectivity. Objective methods are those that yield similar scores no matter who is doing the scoring. In general, paper and pencil tests, checklists, and rating scales are more objective than performance tests and observations. It is necessary to establish scoring rules that facilitate clear assignment of scores to each response. For a less objective test (e.g., an essay), this may require developing a key that gives scoring rules and examples of typical responses and their proper scores.

- Reliability. Reliable measures are those that yield constant scores relatively free from chance variation over time. To improve reliability, it is important that instructions and testing con-

ditions be the same for all persons; that practice, or sample items, be given if possible to avoid effects from unfamiliarity with the type of measure being used; and that several measures for the same objective be used rather than one.

- Validity. Valid measures are those that are closely related to and broadly representative of the outcome being measured. Measurement techniques that are relatively objective and reliable also tend to be relatively valid. However, additional assurance of a measure's validity is obtained by constructing a logical rationale for each measure used (to see better its relationship with the desired outcome) and by providing sufficient measures of each important outcome. If several independent measures of the same outcome produce highly similar results, the measures are likely to be acceptably valid.

- Efficiency. Efficient measures are those that yield reliable and valid scores at a low cost in terms of money, personnel, and time. In general, this means that the measures can be administered to groups on a single occasion and under normal rather than contrived circumstances (e.g., an ordinary classroom setting). Measures that can be scored and processed quickly and easily are more efficient than those requiring more time and expertise.

- Non-reactivity. A non-reactive measure is one that does not unduly influence the behavior of the person to whom it is being applied. Relatively non-reactive measures include routinely collected records and observations--for example, observations of the frequency of certain behaviors. Such techniques may not be as relevant to career education measurement as to other areas, but it is important to be aware of the level of reactivity and to try to minimize it.

Schedule. Procedures for conducting the evaluation are: scheduling, identifying and training administrators, identifying and orienting participants, and administering instruments.

A detailed schedule for training administrators, orienting students, and collecting data should be prepared. It is best to collect data in as short a time period as possible to minimize disruption of regular school schedules. Rooms of adequate size and appropriate facilities should be reserved. Schedules should be made available to all participants to facilitate coordination efforts.

Different types of people might serve as test administrators. Regular teachers can probably be used if the evaluation focuses on paper-and-pencil tests. If other types of measures are used, such as performance tests or work samples, it might be preferable to hire outside persons from the relevant career area. Depending on the tasks to be performed, some training of administrators might be needed. Training can employ a combination of approaches including written materials, workshops, and practice exercises.

Participating students may require some orientation to the purposes and procedures involved in the evaluation. Orientation should be uniform for all students and can include both written and orally presented materials.

Data processing and statistics. The choice of appropriate processing and analysis procedures depends largely on the measures used, the evaluation design, and the resources available. It is possible that much of the data processing will be done manually, especially when samples are small and resources limited. Often, hand-scoring involves making judgments about the adequacy of a response or translating a complex response into a single score. This would be true, for example, in evaluating a work sample related to the instructional program (e.g., composing an adequate letter requesting a job interview).

Where such judgment is needed, several points should be considered. First, does the scorer understand the criteria and apply them consistently over time? Second, has information identifying participants been concealed to help ensure scorer objectivity?

Third, would two or more scorers assess the same response similarly? To answer these questions, it is desirable to score a random sample of responses twice. If results are inconsistent, it would be wise to retrain the scorers and rescore doubtful items.

Often, a computer can be very helpful if resources permit. The evaluator's job is to have data recorded onto computer cards or tape and to determine what information the computer should provide and how it should be presented. A computer programmer can then write or select an appropriate package, and the computer will provide the results.

The next step is analyzing the processed data. As a minimum, evaluations of career education activities are expected to include the following statistical data on both treatment groups and comparison groups or standards: (1) measures of central tendency; (2) measures of dispersion; (3) attrition rate; (4) pre- and posttest distributions (when appropriate); and (5) obtained level of statistical significance. Tests of statistical significance are used to determine whether differences among groups tested are greater than those that would occur by chance alone.

Results. Criteria include the statistical significance of the results, the consistency of the results, and their educational significance. Evidence for a career education program's effectiveness must not rest solely on statistical significance, which can be obtained for very small effects by using sufficiently large sample sizes. Statistical significance can be and often is achieved with a difference between means of one raw score point or less. Thus, do not assume that statistically significant results alone demonstrate that a career education program is worth maintaining or replicating.

Educational significance has to do with the meaningfulness of what is observed. Are differences between the treatment group and the comparison group big enough--large enough--to suggest that the higher-scoring group can do something important that the others cannot do?

In career education, for example, do treatment group students show enough increase in knowledge about occupations, competency in basic academic skills, good work habits, and personally meaningful work values that they are likely to make better choices? In other words, is the observed difference large enough to be worth the effort it took to achieve it? The size of the treatment impact can be judged by past experience as reflected in the research literature indicating the expected frequency, direction, and size of post-treatment differences between treatment and comparison groups on the measure in question. One rule of thumb for evaluating the educational significance of a treatment is that the observed posttest scores exceeded the expected scores, either comparison group scores or scores determined on some other basis, by at least one-third of a standard deviation. In addition, the cost of the treatment can be compared with the cost of other activities that produce the same effect.

The Nitty-Gritty of Obtaining JDRP Approval

The purpose of this section is to demystify the JDRP approval process for local career educators and to spell out the procedures involved in getting a 10-page written submission up before the panel. A fictitious panel deliberation will then be presented to demonstrate how the panel functions during one of its sessions.

Writing the Submission

A very valuable resource that can be used in preparing submissions is the JDRP Ideabook (referenced in Appendix C). Submissions should contain two key substantive parts:

- Describe the project briefly (3 to 4 pages) including the following key points:

- what the project intended to do (the goals)

- what the project did (the treatment)

- who the intended users were (the target groups)

- in what ways the project worked (claims of effectiveness)

- what the project costs were--divide this into initial installation and maintenance

- Present evidence of project effectiveness or evidence to support claims made above (6 to 7 pages). For each claim made, the following points must be covered:

  - describe exactly what you measured

  - describe exactly how the measuring was done (e.g., tests, observational ratings, skills completion checklists)

  - show that the measures used actually measured what they were intended to measure (measures are valid)

  - show that the measures used actually produced consistent results with repeated use (measures are reliable)

  - show that the measures were made by someone who had no vested interest in the success or failure of the project (the procedures are unbiased)

- show the treatment produced some result or change that is different from what would have happened with no treatment

- show that the change achieved is truly meaningful to the field of career education

- show that the change is due to the treatment and not to any extraneous factors

- show that the change can reasonably be expected to occur among other users, not just those tested in the project (project is generalizable)

- show that the change can be replicated elsewhere with comparable effects, considering cost, facilities, staff, etc. (project is replicable)

A sample format is included in Appendix A. Since the written submissions are the principal basis of the panelists' judgments, it is important that this information be clear and complete. The maximum permissible length of material to cover each submission is ten single-spaced typed pages, including tables. The most important section, of course, is the summary of the evidence of effectiveness. However, do not neglect the brief but specific description of the product or practice (including goals or targets of the process) and data on program costs so that the panel can consider the educational significance relative to the effort and costs required for adoption. The panel is concerned that the products or practices whose effectiveness is to be reviewed are clearly identified, that common implementation problems are described, and that full start-up and operating costs are presented so that schools interested in selecting the item will do so without misunderstanding its costs. This information provides

the basis for the one-page project summaries included in Educational Programs That Work (referenced in Appendix C), the federally-funded publication containing descriptions of all JDRP-approved projects.

Included in Appendix B are three sample JDRP submissions for the career educator to study in depth. Their credibility is established by the fact that the JDRP approved one of them unanimously, while the others received just one dissenting vote each. All three were approved in 1978.

Action Steps in Processing the Submission

Prior to its review, U.S.O.E.'s Office of Career Education requires that the submission secure state approval. Then, the OCE staff will review and initiate dialogue with you concerning the submission. It will be an OCE staff member who will eventually present the project for JDRP approval.

If the project is not approved by the OCE staff for submission to the panel, it simply means that based on their advice and expertise, the project is unlikely to be approved. Review the project records and evaluation data. Study the OCE staff's critique, and then make the decision to continue or discontinue with the effort to submit to the JDRP. Many programs have had impact in one local educational agency yet could not be applicable in other locales.

Once OCE is satisfied with the submission, a memorandum of transmittal is prepared and signed by a U.S.O.E. Deputy Commissioner stating that the submission has been pre-reviewed and, to the best of the Deputy Commissioner's knowledge, is factually correct and that the products or practices are socially fair and apparently not harmful. This is the official notification of a project's readiness for presentation to the JDRP by the OCE. When this memorandum is signed, it certifies to the JDRP that all stages of investigation have been completed.

Fifteen copies of the transmittal memorandum and each submission are forwarded to the JDRP's Executive Secretary, who schedules the JDRP meeting. Although the JDRP is made up of eleven persons from each agency (U.S.O.E. and N.I.E.), the meeting requires only seven (at least three from each office) to be present in order to have a quorum. Panel members require a minimum of five working days to review the submissions prior to a meeting. Typically, the panel will consider three submissions at each meeting, with each submission receiving up to an hour of the panel's time. An OCE staff member will represent the project at the meeting, usually accompanied by the local project director and the project evaluator.

Activities During and After the Panel Review

The bulk of the time in a panel review is spent on questions for clarification that may be put to the Program Officer, or to the project director and evaluator, by the panel members. A vote is taken on whether there is adequate evidence of effectiveness. Voting is by closed ballot, but the votes of the individual panel members are recorded by the Executive Secretary after each vote has been completed. Panel members disqualify themselves from voting on submissions made by programs in which they are directly involved. A simple majority is required for a panel decision that the evidence of effectiveness is convincing. A tie vote is a decision that the evidence is not convincing. A majority vote carries with it not only the honors and national recognition but also the responsbilities of being added to a select list of exemplary educational programs. The panel's decision is announced publicly immediately following the project review.

Products or practices not favorably reviewed by the panel may be resubmitted at any time. The panel makes every effort to clarify weaknesses, and makes recommendations for a stronger resubmission. If a project director feels that through resubmission he or she can satisfactorily answer the panel's concerns, then resubmission is advisable. If not, do not

resubmit. The panel itself often recommends resubmission following comments on a program's defined deficiencies (naturally, approval cannot be guaranteed). The minutes from each meeting are distributed to all panel members, OE Deputy Commissioners, and N.I.E. Associate Directors; copies can be obtained by those whose submissions were reviewed in the meeting.

The following is a fictitious but descriptive account of a typical panel meeting:

> The panel convened at 9:30 a.m. in Federal Office Building 6. The six panel members and the chairperson sat along one side of an oval table. The panel's Executive Secretary was also present to record the proceedings. The first project in front of the panel was a high school career education activity titled Project AMERICA. The chairperson invited the representatives of the project and the OCE program official to join the panel members at the table.
>
> The OCE program official first introduced all of the participants, including the director of Project AMERICA and its evaluator. The chairperson then proceeded to summarize the the submission, both to refresh the panel members' minds about which project was being reviewed and to describe it for all of the visitors at the meeting. The chairperson had apparently gone through the submission quite extensively in advance, highlighting portions that were particularly important.
>
> The chairperson then opened the session for questions from panel members. For a few minutes, silence prevailed since no one asked any questions. Finally, a member of the panel said that it was hard to pick up from the submission the nature of the program activities that would be exported. He asked: What did a teacher actually do in the classroom as contrasted with what a teacher did in the control

classroom, and what is in the instructional materials package that would be exported? The Project AMERICA director spent about five minutes summarizing the main procedures and products involved in the program.

Several panel members then asked some questions about the evaluation, which the project evaluator answered. One was a simple clarification question. The others involved differential effectiveness of the program at different grade levels, whether the program had achieved results that spoke to the sustaining effects question, and whether the effects might hold up with other not so similar student populations. At the conclusion of this dialogue, one of the panelists suggested a caveat to dissemination of this program: data presented are restricted to white, middle-class students.

After a pause, the chairperson asked whether the score differences between treatment and control students were large enough to be educationally significant, referring to a table in the submission containing the results from administering the primary data collection instrument. The instrument had 54 items and the mean score difference between treatment and control students on the posttest was 5.96 points. The chairperson asked the project evaluator to comment on what a mean difference of 5.96 points truly meant in terms of educational significance of the instructional materials. The project evaluator responded by pointing out that such a difference was meaningful, given the fairly small amount of time that treatment students were exposed to the materials and the low cost of the materials.

The chairperson then asked if any panel members had further questions. One or two other clarification questions were asked of the project director. When no additional

questions were forthcoming, the chairperson asked the panel members to vote. Each panelist had a ballot with the project's name pre-printed on it on which he or she voted "yes" or "no" for dissemination. Since each member's vote is eventually made public (in the transcription), the ballot also contained a place for the name of the panel member.

The chairperson collected all of the ballots and counted them. Some suspense was generated while something that looked like recounting the votes took place. It turned out that someone on the panel had marked the ballot for the group that was supposed to present its project next instead of the Project AMERICA ballot. After that error was corrected, the chairperson announced the vote: 6-1 approving.

Questions You've Always Wanted to Ask, Etc.

1. How does one separate state validation, the JDRP process, and the NDN?

   Ans: Those are three different activities. The state validation procedure is not required by the JDRP. It is purely a function of the states. Some states do require state validation before considering a JDRP submission. Other states go straight to the JDRP. Approval by JDRP means that a federal program office may disseminate the project. To receive federal dissemination funds from the NDN as D/Ds, those projects that have cleared the JDRP submit proposals in a competitive bidding process.

2. Does the panel take into consideration the type of project represented in the submission, in light of the voids that exist in the NDN?

Ans: At the JDRP level, there is no priority list. The judgment of the panelists is based on the evidence presented. Did it hold up or didn't it? In terms of projects submitted to the NDN, there is a new situation to look at. Within the NDN submission system, there is a priority list. There is a move on to enlarge and broaden the repository of tested practices and methods. For example, to move beyond the early childhood area, the NDN is opening up a wider avenue for postsecondary options as well as for additional programs in special education, vocational education, and career education.

3. Is a program that passes the JDRP authorized to appear in Educational Programs That Work?

Ans: Yes, but that does not automatically include NDN funding. Only about 50% of the programs that appear in Educational Programs That Work receive NDN funding for dissemination. NDN funds, like other federal funds, are provided for in the annual budget. The level of funds available for dissemination purposes may vary from year to year.

4. Is there any predictability as to which seven of the 22 members of the panel will show up for any given session?

Ans: No. The Executive Secretary of the panel knows the nature of the submissions before he calls together a quorum of seven panelists. Members of each panel are different as selection is basically rotational. Some members are selected on the basis of a particular expertise which could assist the panel's review.

5. Is there some way of knowing who is more stringent and who is less stringent among the members of the panel and of being able ahead of time to influence which seven members will make up your quorum?

Ans: Certain configurations of seven panelists may be more stringent than others. However, the structure precludes any outside influence being brought to bear on the composition of a particular quorum.

6. If there is a resubmission, are you assured that the panel will be reconstituted to include the same members who served when the original submission was reviewed?

   Ans: No. However, the program official, when introducing the project director and the project evaluator at the second session of the panel, is at liberty to say that this is the second time around. "They were asked to go back and get such and such type of data and it can be found on page 7 of the submission, etc." The second panel, which may include a member or two from the initial group, will completely review the earlier panel's concerns in the context of the submission.

7. Do project staff have any influence over the order in which the submissions are reviewed in a given session of the panel?

   Ans: Normally, you are scheduled to appear in the order in which your submission has entered into the system. However, if you are scheduled to appear last, and--let's say--you have a plane flight out of Washington, D.C. at 11:30 that morning, a request to the panel will usually result in an adjustment being made. The panel tries to be as flexible as possible.

8. How often does the panel meet?

   Ans: There is no regular schedule. It meets whenever as many as three submissions have been received. The panel has been known to meet to review just one submission if others have not come in recently.

9. Looking at 10 pages of written material and data tables, how do the panelists know that what they are reading really went on in the project? After all, the JDRP does not require state validation in which site visits are made, and the panel members do not make visits themselves.

   Ans: The panelists rely on the credibility of the project representatives in that session, and even more on the credibility of the written submission. The panel, of course, relies on the federal program office vouching for the submission, too.

10. Is it absolutely necessary for a project to have government funding (state or federal) before it can be considered by the JDRP?

    Ans: The JDRP has recently changed its position on this question. Historically, only federally funded projects qualified. Under the new rule, only for-profit corporations are excluded.

11. If I were a practicing school administrator or superintendent, how would you respond to me when I argue that because of JDRP/NDN funding, I am losing the services for anywhere from 45 to 60 days of the most qualified persons on my staff as they travel around the country, while the taxpayers of my own district are not receiving those services?

    Ans: Some very good projects have never gone through the process because of that very issue. What it really comes down to is that if you look at the history of education in this country, you have a number of problems. Number one: in education, people keep reinventing the wheel. To answer your administrator, you could say that we have committed our efforts to this program to improve the education of children. We have demonstrated that this program does make a difference to children. We feel that we have an obligation

to the educational community to disseminate this information to other schools so that if they have resources to develop new programs they won't duplicate what we have already done. Number two: if we have an obligation to children for the betterment of their education, then we also have an obligation to disseminate this information to other schools. Essentially, there is a moral and ethical responsibility of educators to share their information.

At the LEA level, exactly what you describe will take place. It will be true the minute you receive JDRP approval. You will start to get requests for information, and you need to realize this in advance. There is no economic benefit to the LEA to go through this system. If you really believe in the project that you have taken through the JDRP process, then you have a certain responsibility to share this information. How far you share it will be controlled at the LEA level.

12. How do you back out of the NDN if you get inundated with requests and your staff get over-committed along the lines of the previous question?

    Ans: Very simply, you do not request funding from the NDN. Only you can determine the extent of your dissemination practices. And these are spelled out in the proposal you prepare for grant funds from the NDN.

13. Is there an appeal procedure if your submission is not approved?

    Ans: No formal appeals are necessary, as you can come back as many times as you want with new data and a resubmission.

14. Does the panel use an objective rating scale, or does it rely on its impressions of the evidence presented?

    Ans: The latter. Panelists are asking the questions: is the project effective, can it be replicated, does it help students, teachers, etc.? The panelists reach a judgment based on all the evidence presented. If they approve a project, they are saying that it can be disseminated. It is up to the individual LEA to decide to adopt it or adapt it to the local setting.

15. Does the JDRP expect you to document that your program was the cause of the principal intended outcomes?

    Ans: Yes. The panel requires that evidence be presented which indicates that it is the project, rather than other external factors, which is producing the beneficial outcomes.

16. Where can I go to get help in putting together my submission?

    Ans: The references listed in Appendix C would be very useful, especially the JDRP Ideabook.

APPENDICES

Appendix A
JDRP Submission Format

Appendix B
Sample JDRP Submissions

Developmental Career Guidance Project
Pima County
Tucson, Arizona

Project Equality
Highline Public Schools
Seattle, Washington

Project CAP
Boston Mountains Educational Cooperative
Greenland, Arkansas

Appendix C
References

Appendix A

*FORMAT FOR SUBMITTING MATERIAL TO THE JOINT DISSEMINATION REVIEW PANEL

PROGRAM AREA: (e.g., Title III, reading, career education, environmental education, education for the handicapped)

I. INTERVENTION TITLE, LOCATION:

Specify the title of the intervention and the location for which evidence of effectiveness is being submitted.

II. DEVELOPED BY

Indicate who developed the intervention originally, even if this happened at a different site than the one for which evidence of effectiveness is being presented.

III. SOURCE AND LEVEL OF FUNDING:

List all funding sources for the intervention at the location for which evidence of effectiveness is presented; for each source, list the amount of funds. (See Figure I. for an example)

IV. BRIEF DESCRIPTION OF INTERVENTION:

Briefly describe the intervention for which claims of effectiveness are being made. The description should cover at least the following points:

- What is the intervention?
- What are its objectives?
- What claims of effectiveness are being made?
- What is the context in which it operates?
- Who are the intended users and beneficiaries?
- What are the characteristics of the groups on which the intervention was developed and tested?
- What are the salient features of the intervention?
- What are the costs for adoption and maintenance of the intervention? (See Figure I. for explanation)

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*The submission paper must not exceed ten (10) single-spaced pages including any tables, graphs, etc.

V. EVIDENCE OF EFFECTIVENESS

Describe the evidence of effectiveness for the intervention. This section should deal with each of the following points, although not necessarily in the same order:

Interpretability of measures: Evidence that the quantitative measures are reliable and valid indicators of the effects claimed.

Credibility of evidence: Who collected and analyzed the data, what assurances are there that the findings are objective?

Evidence of impact: What is the evidence that something happened? What are the effects claimed for the intervention?

Evidence of statistical reliability of the effects: What is the evidence that the effects happened often enough and with sufficient reliability to be likely to happen again under similar circumstances?

Evidence that the effects are educationally meaningful: Can alternative explanations such as practice effects, maturation, selection of superior treatment groups, etc., be ruled out?

Evidence of generalizability to the populations for which the product or practice is intended: Evidence that the product or practice has been tested widely enough and under sufficiently diverse circumstances to give assurances that the effects claimed may be similar when the product or practice is used elsewhere for the populations intended.

FIGURE I — An Illustration of a Table Shell for Showing Costs

Source and Level of Funding of Intervention		
	Installation (Non-recurring Costs)	Subsequent Years (Recurring Costs)
Personnel		
Personnel Training		
Facilities		
Equipment and Materials		
Consumable		
Other Costs* - Specify		
_____		
_____		
_____		
Total		

*e.g., transportation, technical assistance, public relations, etc.

Appendix B

Sample JDRP Submissions

AIR-66700-4/78-TR1(9)

PROJECT EQUALITY

Highline Public Schools
Seattle, Washington

A Submission to the
Joint Dissemination Review Panel

Susan L. McBain
Dewey Lipe
American Institutes for Research

30 April 1978

The information reported herein was obtained pursuant to contract no. 300-77-0303 with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to document information according to their observation and professional judgment. Consequently, information, points of view, or opinions stated do not necessarily represent official Office of Education position or policy.

PROGRAM AREA: CAREER EDUCATION

ACTIVITY TITLE, LOCATION: Project Equality, Highline Public Schools, Seattle, Washington

DEVELOPED BY: Highline Public Schools

SOURCE AND LEVEL OF FUNDING:

1973-74:	$35,740	ESEA Title III
1974-75:	82,864	ESEA Title III
1975-76:	71,268	ESEA Title III
1976-77:	38,548	ESEA Title IVc
1977-78:	36,800	WEEA

BRIEF DESCRIPTION OF ACTIVITY:

The major thrust of Project Equality has been the reduction of sex-role stereotyping in students at the K-6 grade levels through implementation of materials which counter such stereotypes in both occupational and home sex roles. To accomplish this purpose, the staff of Project Equality have developed three sets of materials, which may be used independently or in combination.

Activity Description

Each set of materials is designed to provide students with nontraditional sex role models. The development of materials extended over the project's first three years of operation (1973-76), with final field testing taking place during the 1977-78 school year. The three sets of materials are:

1. Occupation Simulation Packets. This set of materials consists of five separate packets, each of which may be used alone. Two packets have been developed for use with grades K-2 students, two for students in grades 3-4, and one for students in grades 5-6. These packets are designed as a hands-on career education activity for elementary students based on the "isolated skill concept." This is the singling out of a saleable work skill required for a wide variety of jobs and already possessed, in some measure, by the student. The student identifies and uses the skill in a hands-on simulated work experience. As students apply their saleable skills in a variety of job-related activities, it becomes clear that: (1) a skill is not dependent on sex; and (2) a skill required for one type of work is often transferable to another type of work. Discussion questions for teacher use with the class also emphasize these two points. The packets include:

- Color Discrimination - This packet uses the skill of color discrimination, which is required in such occupations as interior decorator and electrician. Activities include sorting bundles of wire and socks by color. Time usage: 2-3 hours over a 2-3 week period. Grade levels: K-2.
- Crawling and Squatting - This packet uses the skills of crawling and squatting and demonstrates how they are needed in occupations such as plumber and stock clerk. Activities include stocking "grocery shelves" and crawling under "houses" to tighten pipes. Time usage 2½-3 hours over a 2-3 week period. Grade levels: K-2.
- Assembling - This packet uses the skill of assembling an item in a specific sequence. This skill is required in such occupations as factory worker and baker. Activities include assembling a ballpoint pen and a bicycle reflector. Time usage: 2-4 hours over a 3-week period. Grade levels: 3-4.
- Creativity - This packet uses the skill of creativity, which is required in such occupations as artist, weaver, and architect. Activities include making puppets and weaving wall hangings. Time usage: 8-10 hours over a 3-4 week period. Grade levels: 3-4.

- Measuring - This packet uses measuring skills found in different occupations, including shoe salesperson, pastry cook, and carpenter. Special attention is paid to avoiding sex stereotyping in cooking and sewing occupations. Activities include measuring a coat pattern and a wearer to determine if the coat would fit and measuring task accomplishment with a stopwatch. Time usage: 3-6 hours. Grade levels: 5-6.

Lesson plans and many required materials are included with the packets. The materials show great sensitivity to many kinds of discrimination: illustrations show a mix of races as well as sexes, and a discussion of how to deal with handicapped children is included in the Color Discrimination and Crawling and Squatting packets.

2. Yellow, Blue, and Red Book. This packet contains a large number of ideas for short-term activities which help the teacher and students to expand their awareness of sex-role stereotyping, and broaden their view of sex roles in the home and of appropriate job opportunities available for all qualified people. Time usage: 3-5 hours over a 3-week period. Grade levels: 1-6.

3. Many Thousand Words - Work Pictures. This looseleaf book contains a set of 8 x 10, black and white pictures of women and men, and girls and boys in a variety of non-stereotyped work settings at home, school, and in the community depicting various skills and abilities. Discussion questions focus on the skills needed and on whether persons of either sex might have those skills. Time usage: 5 hours over a 3-week period. Grade levels: 1-6.

Common Characteristics of Materials. All Project Equality materials have been designed to have the following characteristics:

- They provide content material which can expand students' perceptions of occupations open to females and to males.
- They fit within the context of subjects the teacher is already expected to cover in the classroom.
- They are self-contained.
- They are easily adapted to different classroom settings.
- They do not require any additional teaching or support staff members for implementation.

Measurement of Achievement. The Project Equality staff has also adapted the "Who Should" test, from work originally done by Dr. Lynne Iglitzin of the University of Washington. This test is used with all materials and attempts to measure changes in students' perceptions of occupational and home sex roles. It will be described in detail in the "Evidence of Effectiveness" section of this submission.

Goals and Objectives

The goal of Project Equality is to expand students' perceptions of occupations open to females and those open to males. The following objectives were developed to meet this goal:

Objective 1. Elementary students in grades K-6, where any one of five Occupation Simulation Packets is used appropriately, will have expanded their perceptions of job options open to females and males. By the conclusion of the treatment period, these students will score significantly higher than a control group of students drawn from the same grade levels on the "Who Should" test.

Objective 2. Elementary students in grades 1-6, where the Yellow, Blue, & Red Book is used appropriately, will have expanded their perceptions of job options

open to females and males. By the conclusion of the treatment period, these students will score significantly higher than a control group of students drawn from the same grade levels on the "Who Should" test.

Objective 3. Elementary students in grades 1-6, where Many Thousand Words - Work Pictures are used appropriately, will have expanded their perceptions of job options open to females and males. By the conclusion of the treatment period, these students will score significantly higher than a control group of students drawn from the same grade levels on the "Who Should" test.

In these objectives, the term "students" means those boys and girls who have both participated for the entire treatment period and also have taken both the pre- and posttests. Appropriate usage means usage for at least the number of hours suggested earlier for each packet or set of materials.

Claims of Effectiveness

All three sets of materials were field tested during the 1977-78 school year in two school districts in the Seattle area. The objectives listed above were met in a majority of cases, leading to the conclusion that students have expanded their occupational perceptions to include non-stereotyped jobs for both sexes.

Context

Background. Project Equality's home site was the Highline School District near Seattle, Washington. The impetus for the project was a study of 258 district fifth graders in 1971. The study demonstrated that both boys and girls tended to see jobs in terms of masculine and feminine stereotypes, and that occupational aspirations of the fifth grade girls fell heavily into feminine stereotyped roles. Staff of Project Equality set out to provide materials which were free of sex stereotyping and which demonstrated to students that people of both sexes could perform a wide variety of job tasks.

Field test materials. Project materials were developed and revised extensively during the first three years of project operation. Final field testing in 1977-78 was conducted outside the Highline District to assure that no student exposure to materials had taken place in earlier years. The results discussed in this submission are from two districts, the Northshore and Bellevue School Districts, also near Seattle. These two districts, as well as Highline School District, can be characterized as predominantly white middle-class, with 90% or higher white populations. Northshore School District covers an area which is rapidly evolving from a farm economy to an industrial/residential area. The Bellevue School District contains mainly middle and upper middle class families, with a high percentage (67%) of professional, technical, and managerial employment. Per-pupil expenditures in the Northshore School District were $1,386 in 1976-77, while in the Bellevue School District they were $1,587.

Intended Users and Beneficiaries

The intended users are K-6 students of both sexes and various socioeconomic and cultural backgrounds. The activities are simple, interesting, and experiential, making them usable with students of different ability levels.

Characteristics of Students Involved

Like the total populations of the school districts, the K-6 students with whom these materials have been used are primarily white and middle class. Achievement levels vary, however: latest figures from the annual statewide assessment of fourth grade achievement, using the Comprehensive Test of Basic Skills battery, show Northshore students scoring at the 58th percentile on the average, while Bellevue scored at the 69th percentile on the average. (Students in the Highline District, where materials were originally developed, scored at the 48th percentile.) Each student population was comprised of approximately equal numbers of boys and girls.

Salient Features

The most important features of these materials are summed up by the following points:

- The materials present simple, interesting, bias-free activities which demonstrate that work skills can be possessed by persons of both sexes.
- They are self-contained and can either be used individually or in combination over the K-6 grade range to provide students with a longer series of non-stereotyped activities and concepts.
- The materials are relatively low in cost and the program can easily be implemented within any K-6 curriculum.

Costs

Presently, Project Equality staff members train local district staffs to implement materials. It is suggested that adopting districts plan to involve the following personnel: the district career education director and/or curriculum director; an elementary principal; an elementary school librarian; and six elementary teachers. A district adopting all Project Equality materials should plan to assume costs for the following:

- A 1½-day training session for staff members implementing the materials
- Two ½-day followup meetings after the training session
- Adoption of Occupation Simulation Packets
- Adoption of the Yellow, Blue, and Red Book
- Adoption of the Many Thousand Words - Work Pictures
- Evaluator for field testing of materials (if desired)

Table 1
Approximate Costs for Adoption of Project Equality Materials

Staff Development	First Year Implementation Costs
District Implementation Team:	$650.00
1 Career Education Director	
1 Elementary Principal	
1 Elementary Librarian Substitute	
6 Elementary Teachers at $35/day	
Materials	
Occupation Simulation Packets:	
K/2 Crawling and Squatting	275.00
K/2 Color Discrimination	200.00
3/4 Assembling	180.00
3/4 Creativity	300.00
5/6 Measuring	365.00
Yellow, Blue, and Red Book	50.00
Many Thousand Works - Work Pictures	50.00
Contracted Services	
Evaluator for pilot testing of materials 2 days at $100/day	200.00
	$2270.00

The estimated costs for operation in subsequent years (replacement of lost or damaged items) are $75.00.

Per pupil costs. Since these materials could be used by all district elementary schools in turn, per pupil costs would depend on total number of district K-6 students. Assuming a district had 3,000 K-6 students, per pupil costs would be:

First year:	$0.76
Subsequent years:	0.03

EVIDENCE OF EFFECTIVENESS

Interpretability of Measures

The "Who Should" test was the outcome measure for all sets of materials. There are two forms of this instrument: one for grade levels K-2, and the other for levels 3-6.

K-2 form. The K-2 form has 26 questions which are read to students by the teacher. The students have only the answer sheet, not the questions. Two sample questions are: "At home, who should wash dishes? Men? Women? Or both?" "Who can use a hammer better? Boys? Girls? Or both the same?" All questions are answered by the students by circling a picture of a boy, or of a girl, or of a boy and girl standing together.

3-6 form. The grades 3-6 form of the test has four parts with a total of 41 items. As in the K-2 form, teachers read the questions aloud to students. Part I lists 19 occupations such as carpenter and nurse; students circle "man," "woman," or "both" to indicate who should do the job. Part II lists six jobs done in class such as "eraser cleaner;" response options are the same as for Part I. Parts III and IV list jobs done in the home. Response alternatives to Part III are "father," "mother," or "both," and response alternatives to Part IV are "men," "women," or "both."

Reliability and validity. Experts on sex-role stereotyping at the elementary level reviewed the tests and confirmed their content validity. Test-retest reliability and item validity were assessed in a school district that had not been exposed to instrument and materials development activities and where women's rights were not formally included anywhere in the curriculum.

The test was administered twice to the same students two weeks apart. Most materials required about two weeks of usage, so two weeks corresponded to the interval between pre- and posttests for both treatment and control classes in this study. The test-retest correlations were .62 for the K-2 form (administered to 20 first grade students) and .88 for the 3-6 form (administered to 22 fourth grade students). Item validity was determined by computing biserial correlations between each item and the whole test score. The coefficients for the K-2 form ranged from .19 to .69 with an average of .52. For the 3-6 form they ranged from .41 to .73 with an average of .59. Minor modifications to the test were made on the basis of these data.

Credibility of Evidence

For the 1977-78 evaluation of student outcomes, all tests were administered by the students' classroom teachers. All teachers had received two days of training and followup consultation from the Project Equality staff on how to implement the materials and how to conduct the pre- and posttesting. During these sessions, teachers were instructed to read test directions and items slowly, to stay as close to the script as possible in order to keep instructions similar for all classrooms, and to use a neutral tone of voice. Teachers were told to repeat questions, if necessary, to allow students enough time to think over the questions before marking their answers.

The K-2 form was administered in two sittings during the same day. The 3-6 form was administered in one sitting. Scoring was done by project staff, with two persons independently scoring each test as a check on accuracy. Scores were key punched for computer analysis and all key punching was verified. Project staff members were also responsible for final analysis and interpretation of results.

Evidence of Impact

Evaluation design. The study to assess impact was conducted with K-6 students in the Northshore and Bellevue School Districts. The study was designed to provide pre- and posttest measures of performance on treatment and control students for each packet or set of materials. The rationale for this design assumed that real

student growth could be assumed to have occurred if the group mean pretest difference was not statistically significant and group mean posttest difference was statistically significant following use of any one set of materials with the treatment group.

In each district, treatment schools were selected from the middle range of average school-wide achievement scores within the district. For each treatment school, another district school was selected whose average achievement scores matched those of the treatment school as closely as possible. Because of practical constraints on evaluation in actual school settings, teachers in the selected treatment schools were asked to volunteer to use Project Equality materials in their classrooms. District field test coordinators selected teacher participants from among these volunteers, paying particular attention to achieving a mix of teachers which was representative of the whole district. Control school teachers were also volunteers and were selected on the same basis. The total number of teachers implementing Project Equality materials in the two districts was 37, while the number of control group teachers was 47.

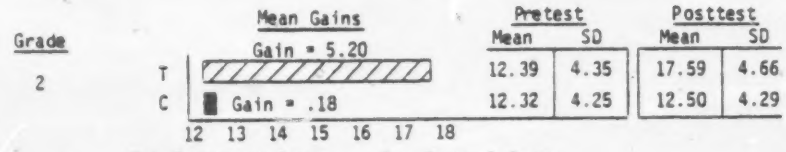
Data analysis. The same outcome measure was used regardless of which materials were taught; therefore, the control students' scores at each grade level were combined into one group, whereas the treatment students' scores were separated according to the materials taught. This accounts for the much larger N's for the control than for the treatment groups. This was judged to pose no problem in analyzing the data, since variances of treatment and control groups were quite similar.

Only those students who took both the pretest and the posttest were included in the analyses. All students in a given grade level who were instructed in the same materials were combined and then compared with all control students at that grade level. For each comparison, a t-test of independent means was computed on pretest means of treatment and control groups and a separate t-test was computed on posttest means. Separate analyses were performed for each Occupation Simulation Packet, for the Yellow, Blue and Red Book, and for the Many Thousand Words - Work Pictures.

Results. Data tables for each analysis are separately presented and explained below. The top of each table consists of a bar graph of the mean gain of each group at each grade level, together with a table of the means and standard deviations on the pre- and posttest. The bottom of each table shows the value of the t-test and the corresponding significance level for each comparison.

Occupation Simulation Packet: Color Discrimination (Table 2). The treatment and control groups started at almost the same point, as shown in Table 2. The treatment group significantly out-performed the control group on the posttest.

Table 2
Color Discrimination (26 items)

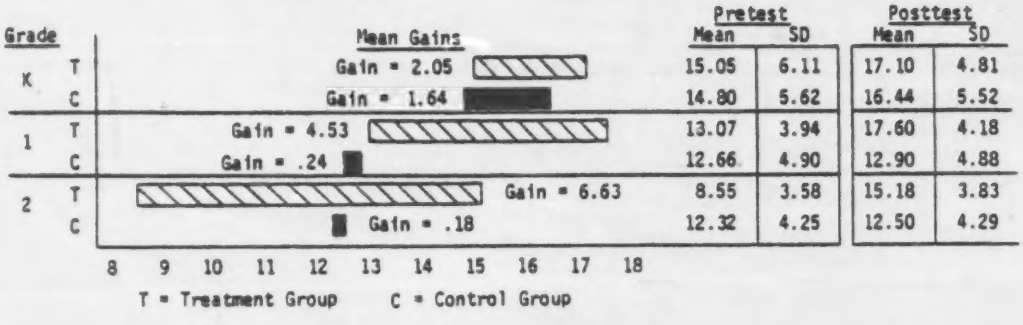


Grade		Pretest Mean	Pretest SD	Posttest Mean	Posttest SD
2	T	12.39	4.35	17.59	4.66
	C	12.32	4.25	12.50	4.29

Grade	N T	N C	t-tests: Pretest t	Pretest df	Pretest sig	Posttest t	Posttest df	Posttest sig
2	41	156	.09	195	NS	6.32	195	<.0005

Occupation Simulation Packet: Crawling and Squatting (Table 3). The first grade treatment group scored close to the control group on the pretest but significantly above it on the posttest. In the second grade, the pretest difference was significantly in favor of the control group; yet the large gain in treatment group scores makes the posttest difference significant in favor of the treatment group. At the kindergarten level, the treatment group showed greater gains than the control group, but these were not significant.

Table 3
Crawling and Squatting (26 items)

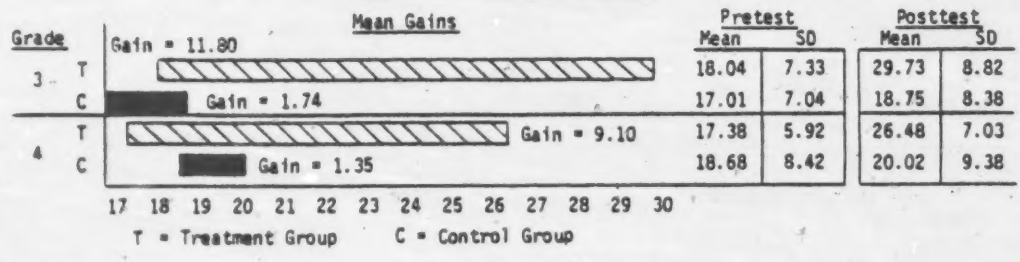

Grade
Mean Gains
K T Gain = 2.05
C Gain = 1.64
1 T Gain = 4.53
C Gain = .24
2 T Gain = 6.63
C Gain = .18
8 9 10 11 12 13 14 15 16 17 18
T = Treatment Group C = Control Group

Grade		Pretest Mean	Pretest SD	Posttest Mean	Posttest SD
K	T	15.05	6.11	17.10	4.81
	C	14.80	5.62	16.44	5.52
1	T	13.07	3.94	17.60	4.18
	C	12.66	4.90	12.90	4.88
2	T	8.55	3.58	15.18	3.83
	C	12.32	4.25	12.50	4.29

Grade	N T	N C	t-tests Pretest t	Pretest df	Pretest sig	Posttest t	Posttest df	Posttest sig
K	20	41	.15	59	NS	.48	59	NS
1	30	166	.50	194	NS	5.52	194	<.0005
2	11	156	3.33	165	<.005	2.22	165	<.025

Occupation Simulation Packet: Creativity (Table 4). The creativity activity was highly effective at both grades 3 and 4, as shown in Table 4. At neither grade were the pretest scores significantly different for treatment and control groups; however, following the treatment intervention, the treatment group far out-performed the control group at both grade levels.

Table 4
Creativity (41 items)

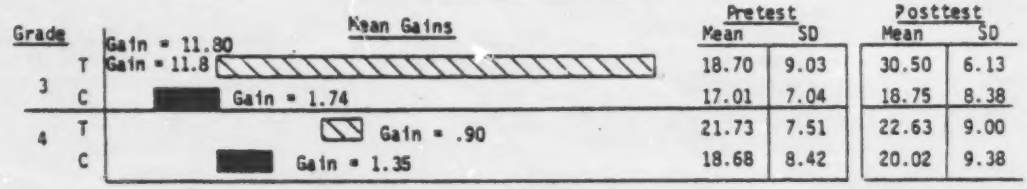

Grade
Mean Gains
3 T Gain = 11.80
C Gain = 1.74
4 T Gain = 9.10
C Gain = 1.35
17 18 19 20 21 22 23 24 25 26 27 28 29 30
T = Treatment Group C = Control Group

Grade	Pretest Mean	Pretest SD	Posttest Mean	Posttest SD
3 T	18.04	7.33	29.73	8.82
3 C	17.01	7.04	18.75	8.38
4 T	17.38	5.92	26.48	7.03
4 C	18.68	8.42	20.02	9.38

Grade	N T	N C	t-tests Pretest t	Pretest df	Pretest sig	Posttest t	Posttest df	Posttest sig
3	49	196	.89	243	NS	7.87	243	<.0005
4	21	177	.90	196	NS	3.82	196	<.0005

Occupation Simulation Packet: Assembling (Table 5). This activity was highly effective at the third grade but not effective at the fourth grade, as shown in Table 5.

Table 5
Assembling (41 items)

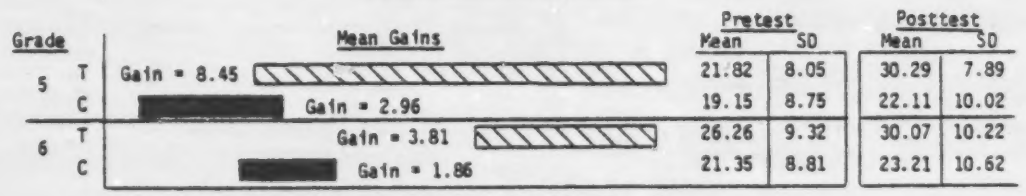


Grade		Pretest Mean	Pretest SD	Posttest Mean	Posttest SD
3	T	18.70	9.03	30.50	6.13
	C	17.01	7.04	18.75	8.38
4	T	21.73	7.51	22.63	9.00
	C	18.68	8.42	20.02	9.38

Grade	N T	N C	t-tests Pretest t	df	sig	Posttest t	df	sig
3	20	196	.81	214	NS	7.86	214	<.0005
4	48	177	2.43	223	<.05	1.76	223	<.05

Occupation Simulation Packet: Measuring (Table 6). This activity worked well at the fifth grade, as shown in Table 6. While the sixth grade treatment group gained more than the control, the difference was inconclusive due to the significant difference in pretest scores.

Table 6
Measuring (41 items)



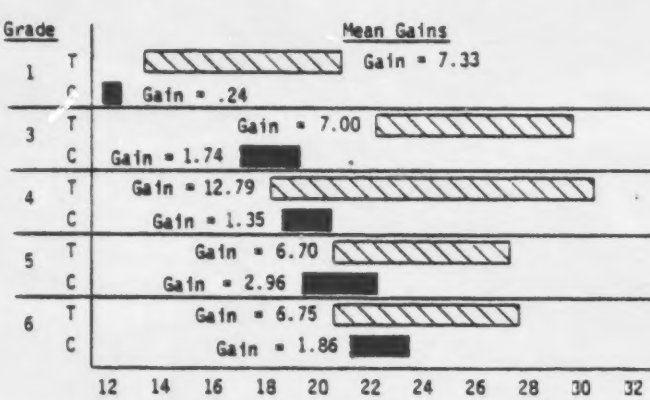
Grade		Pretest Mean	Pretest SD	Posttest Mean	Posttest SD
5	T	21.82	8.05	30.29	7.89
	C	19.15	8.75	22.11	10.02
6	T	26.26	9.32	30.07	10.22
	C	21.35	8.81	23.21	10.62

Grade	N T	N C	t-tests Pretest t	df	sig	Posttest t	df	sig
5	17	194	1.30	209	NS	3.96	209	<.0005
6	27	115	2.49	140	<.05	3.12	140	<.005

Yellow, Blue, and Red Book (Table 7). At all five grade levels tested, the treatment group achieved significantly higher posttest scores than the control as shown in Table 7. At grade 3, the pretest score difference was also significant; however, the posttest score difference was much larger.

Table 7

Yellow, Blue, and Red Book (26 items at Grade 1, 41 items at grades 3-6)


Grade
Mean Gains
1 T Gain = 7.33
C Gain = .24
3 T Gain = 7.00
C Gain = 1.74
4 T Gain = 12.79
C Gain = 1.35
5 T Gain = 6.70
C Gain = 2.96
6 T Gain = 6.75
C Gain = 1.86
12 14 16 18 20 22 24 26 28 30 32

Grade		Pretest Mean	Pretest SD	Posttest Mean	Posttest SD
1	T	13.67	6.50	21.00	4.86
	C	12.66	4.90	12.90	4.88
3	T	22.58	9.33	29.58	9.89
	C	17.01	7.04	18.75	8.38
4	T	18.09	6.83	30.88	9.29
	C	18.68	8.42	20.02	9.38
5	T	20.70	7.99	27.40	12.90
	C	19.15	8.75	22.11	10.02
6	T	20.89	10.20	27.64	10.71
	C	21.35	8.81	23.21	10.62

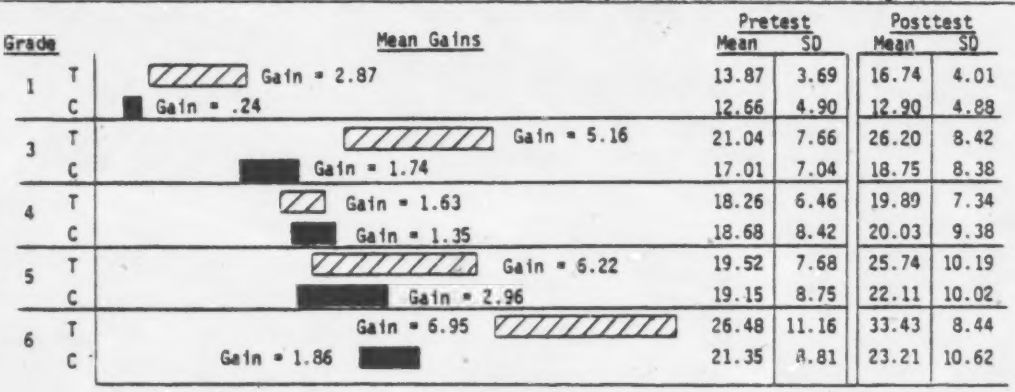
T = Treatment Group C = Control Group

Grade	N T	N C	t-tests Pretest t	Pretest df	Pretest sig	Posttest t	Posttest df	Posttest sig
1	6	166	.38	170	NS	4.01	170	<.0005
3	26	196	2.94	220	<.01	5.34	220	<.0005
4	33	177	.44	208	NS	6.15	208	<.0005
5	20	194	.82	212	NS	1.78	212	<.05
6	47	115	.27	160	NS	2.40	160	<.01

Many Thousand Words - Work Pictures (Table 8). As shown in Table 8, the treatment group outperformed the control group at grades 1, 3, 5, and 6. At grades 3 and 6, the pretest difference was also significant, but the gain in treatment group performance was larger. Growth at the fourth grade level is approximately equal for the two groups.

Table 8

Many Thousand Words - Work Pictures (26 items at grade 1, 41 items at grades 3-6)


Grade
Mean Gains
1 T Gain = 2.87
C Gain = .24
3 T Gain = 5.16
C Gain = 1.74
4 T Gain = 1.63
C Gain = 1.35
5 T Gain = 6.22
C Gain = 2.96
6 T Gain = 6.95
C Gain = 1.86
12 14 16 18 20 22 24 26 28 30 32 34

Grade		Pretest Mean	Pretest SD	Posttest Mean	Posttest SD
1	T	13.87	3.69	16.74	4.01
	C	12.66	4.90	12.90	4.88
3	T	21.04	7.66	26.20	8.42
	C	17.01	7.04	18.75	8.38
4	T	18.26	6.46	19.89	7.34
	C	18.68	8.42	20.03	9.38
5	T	19.52	7.68	25.74	10.19
	C	19.15	8.75	22.11	10.02
6	T	26.48	11.16	33.43	8.44
	C	21.35	8.81	23.21	10.62

T = Treatment Group C = Control Group

Grade	N T	N C	t-tests Pretest t	Pretest df	Pretest sig	Posttest t	Posttest df	Posttest sig
1	38	166	1.71	202	NS	5.10	202	<.0005
3	25	196	2.50	219	<.01	4.17	219	<.0005
4	19	177	.26	194	NS	.08	194	NS
5	73	194	.34	265	NS	2.61	265	<.01
6	23	115	2.08	136	<.01	5.06	136	<.005

Educational Significance of Results

In order to better display the amount of student growth after implementation of Project Equality materials, Table 9 has been constructed to show score gains for the treatment students in standard deviation terms. Each value in Table 9 represents the treatment students' score gain divided by the pre- or posttest standard deviation, whichever is larger. That is, each value is equal to:

$$\frac{\text{posttest } \bar{X} - \text{pretest } \bar{X}}{SD_{\text{larger}}}$$

The larger standard deviation was chosen so that the result would be the more conservative estimate of student gains.

As shown, six of the seven materials produced gains of over one standard deviation at one or more grade levels. Eighteen out of 20 gains were greater than one-third of a standard deviation. Gains of one-third standard deviation or more were obtained at every grade level that was tested. These results were obtained in the relatively short time of two to three weeks, using only one set or packet of materials. It is probable that use of more than one set of materials over a longer period would increase impact futher.

Table 9
Ratio of Treatment Students' Gains to Larger Standard Deviation (Pre- or Posttest)

	Grades						
	K	1	2	3	4	5	6
Yellow, Red, & Blue Book		1.13		.71	1.38	.52	.63
Many Thousand Words		.72		.62	.22	.61	.63
Color Discrimination			1.12				
Crawling & Squatting	.34	1.08	1.73				
Creativity				1.33	1.29		
Assembling				1.31	.10		
Measuring						1.05	.37

Generalizability

The evidence given above demonstrates that these materials are highly effective with populations such as those in the Northshore and Bellevue School Districts. These populations are mainly white and middle class. It is worth noting that all materials, especially those for direct use with students, are unusually attractive and present simple, intriguing activities which make use of skills most students already have regardless of their achievement levels.

Conclusion

Washington State law and national Title IX legislation both speak to decreasing sex discrimination in all aspects of the education system. In recent studies it has been found that schools, for the most part, are not fully demonstrating the past, present, or future participation of females in a variety of work roles in textbooks, audio-visual materials, career education programs and teaching strategies. Across the country educators are attempting to develop and acquire media and materials which present females and males in non-stereotyped occupational and personal roles. The materials outlined in these objectives fit this requirement, and have been tested in an experimental atmosphere and found to be effective. Project Equality's contributions are a positive step in the direction of improved student self-concept, which can serve to benefit all students and the educational system in which they function.

AIR-66700-4/78-TR1(4)

PROJECT CAP

Boston Mountains Educational Cooperative
Greenland, Arkansas

A Submission to the
Joint Dissemination Review Panel

Jack A. Hamilton
Carol B. Kaplan
American Institutes for Research

30 April 1978

The information reported herein was obtained pursuant to contract no. 300-77-0303 with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to document information according to their observation and professional judgment. Consequently, information, points of view, or opinions stated do not necessarily represent official Office of Education position or policy.

PROGRAM AREA: Career Education

ACTIVITY TITLE, LOCATION: Boston Mountains Educational Cooperative for Federal Programs--Career Awareness Program (CAP)
Greenland, Arkansas

DEVELOPED BY: Project CAP staff, Boston Mountains Educational Cooperative

SOURCE AND LEVEL OF FUNDING: Funds for the first three years of the project (1974-1977) were provided by an ESEA Title III Grant and by local school district funds.

Grant Period	Level of Funding			
1974-75	Title III	71,062		
1975-76	Title III	52,885	Local	17,628
1976-77	Title III	32,624	Local	30,228
		$156,571		$47,856

Total = $204,427

YEARS OF ACTIVITY DEVELOPMENT: 1974-1977

BRIEF DESCRIPTION OF ACTIVITY

Goal

Project CAP students, grades 1-8, will be significantly more aware of careers than a similar student population not involved in the project.

Context and students served

The Boston Mountains Educational Cooperative is a consortium of eight school districts in a rural, mountainous area of northwest Arkansas. The cooperative pools the resources of several school districts to develop needed programs for area school children, programs which might not be available to individual school districts. Project CAP serves students from six of the consortium districts, five of which are located in Washington County and one of which is located in Madison County. The estimated population in the geographic area served is 16,000 persons with a school enrollment of 5,100. Ninety percent of the population is from rural farm families; the remaining 10% are considered rural non-farming families. Fifteen percent of all families in Washington County and 33.1% in Madison County are classified as having an income less than the poverty level. The school population is predominantly Caucasian.

Claims of effectiveness

The claims of effectiveness are that Project CAP staff-developed materials and related educational activities result in significantly increased career awareness among elementary and junior high students from low-income, rural areas.

Program description

CAP curriculum. The curriculum was developed to show students that school subjects are important and related to the world of work by pairing a specific academic skill with a selected occupation. For example, the skill of telling time on a clock is linked to the occupation of cosmetologist in a learning packet that describes the importance of keeping track of time so customers are not kept waiting. The curriculum has been revised to include a scope and sequence chart that presents occupations and career education concepts to be taught across the 15 USOE clusters

as well as a self-awareness cluster. For each grade level, two packets in each of the 15 occupational clusters plus two packets on self-awareness were developed for a total of 32 packets at each level. The occupations selected were varied in regard to entry-level requirements.

CAP materials. The materials include cluster units (with accompanying bulletin board materials), teacher directions, student packets, and testing instruments. Packet lists are distributed to participating teachers so they can request CAP packets to fit into their lesson plans. Teachers are encouraged to use packets at the rate of at least one per week.

CAP packets. Packets targeted for use in grades 1-6 were designed to be completed in 15 or more minutes of class time and to be infused into the ongoing curriculum. Packets for grades 7-8 were designed to occupy the same amount of class time, but they are occasionally used as separate units rather than being infused into the curriculum. The packets contain a career script that presents required tools, tasks, training, work conditions, and economics as well as the concept of work as a way of life. Emphasis is given to developing student awareness of personal preferences and to participation in decision making, with the opportunity to be creative in problem solving. The packet teaches an academic skill by demonstrating how a worker needs that skill and by providing practice activities. The posttest in each packet covers both career concepts and the academic skill. Bulletin board materials of printed letters and pictures, as well as a suggested layout, are provided. Teachers are encouraged to vary or add to the materials in any way they choose.

Project staff. The CAP staff consists of a project director, two curriculum coordinators, a deputy evaluator, a bookkeeper-secretary, and a machine operator. One consortium district (Greenland) provides office space for the project director and for the coordinators. Each coordinator is responsible for three schools. The coordinators go to the schools one day per week so that there are weekly meetings with teachers in each school. The coordinators meet with elementary and middle school teachers as well as principals and superintendents. The deputy evaluator visits each school once per week, while the project director makes periodic visits.

Staff development. During inservice days at the start of each school year, coordinators meet with teachers and principals to present samples of new curriculum units (packets) for the benefit of both new and returning teachers. During the year, training is conducted on an individualized basis during the weekly coordinator visits. Each teacher receives training concerning how to use and vary the instructional packets, while the coordinators receive suggestions for improving packets and ideas for developing new ones.

Weekly status report. A short report is completed each week by every participating teacher and principal, providing a communication channel with project staff as well as a double check for CAP administrative channels.

Parent-community involvement. A major concern of the project is parent-community involvement. Newsletters containing articles written by teachers and students who are participating in the program are sent home with each child. Teachers are given a Resource People List that indicates community members who will visit classes, or whom groups of students may visit, to discuss their occupations. Parents are invited to class to describe their careers. The project director and curriculum coordinators meet with the P.T.A. and school board groups to discuss the CAP program.

Costs

The 1974-77 budget for this project was $204,427. The six participating districts paid $47,856 of that amount. The average cost per student per year was $22.56. Costs for salaries included the project director, two curriculum

coordinators, an evaluator, a bookeeper-secretary, and a machine operator. The school districts provided office space for the director and coordinators as well as space for packet development work, printing, and packet storage. The following table presents costs for the three years of project development.

Table 1: Costs

	1974-75	1975-76	1976-77
Project Personnel	59,382	58,061	55,328
School Personnel Training	3,993	2,966	3,741
Equipment, Materials, and Consumables	7,687	9,486	3,783
	$71,062	$70,513	$62,852

The estimated costs of replicating the Project CAP program in an adopting school are shown below:

Table 2: Replication Costs

ITEM	COST
Set of 32 consumable packets	$1.00 per student*
Teacher's manual for each grade level	$2.00 per manual*
Consultant fee (optional)	$200.00 (2 days of a Project CAP consultant, at $100 per day) plus travel expenses

*does not include shipping charges

EVIDENCE OF EFFECTIVENESS

Interpretability of Measures

Project CAP staff administered two data collection instruments, one project-developed and one developed by an independent test development organization.

The Career Awareness Test (CAT). The CAT is a staff-developed instrument comprised of 30 multiple choice items and designed to measure knowledge of selected occupations and the training/education required to enter them. The instrument has three different versions: one for grades 1-3, one for grades 4-6, and one for grades 7-8. It is designed for group administration and the questions are read orally by the examiner.

Validity of the CAT. Prior to the drafting of items for the CAT, a review of relevant literature and materials was conducted. The Encyclopedia of Careers and Vocational Guidance, the Occupational Outlook Handbook, materials from Ohio State University's Center for Vocational Education, from the Oklahoma State Department of Vocational Education, from Cobb County, Georgia, and selected commercially published materials were reviewed. Based on this review, Project CAP staff selected 15 occupations from each of 15 career clusters.* These occupations were selected on the basis of present and forecasted demand, and were representative of the full range of positions on the career ladder from entry level through professional level.

*Project CAP staff utilized the U.S. Office of Education's classification of occupations into 15 clusters.

Using the total of 225 occupations across the 15 career clusters as their reference group, Project CAP staff wrote a minimum of 10 test items for each of the 15 clusters. These 10 or more items for each of the 15 clusters were administered to a pilot class at each of the levels to find the most discriminating items. An item analysis was conducted on the results obtained from each of the pilot classes. The two items from each cluster that best discriminated students according to their knowledge of occupations were combined to form separate 30-item versions of the instrument for each of the three levels.

Reliability of the CAT. To determine the reliability of the three versions of the CAT, each version was administered to 100 students at the respective grade levels. Each version of the instrument was divided into two equal parts and the scores on one half were correlated with the scores on the other half by computing Pearson Product-Moment correlations (corrected by the Spearman-Brown Prophecy Formula). The following internal consistency reliability coefficients were obtained:

Level	r
Grades 1-3	.68
Grades 4-6	.77
Grades 7-8	.71

The Career Knowledge Test. Published by Evaluative Research Associates, Inc., St. Louis, Missouri, the Career Knowledge Test is designed for students in grades 1-3 and assesses their knowledge of the world of work. Project CAP staff selected the Career Knowledge Test because the items included in it test knowledge of occupations, which are representative of all 15 USOE career clusters. It is a 30-item picture instrument in which items test knowledge of the similarities and differences of various occupations and of their required tools. The reliability of the instrument is shown by a reported internal consistency reliability coefficient of .85.

The Orientation to Career Concepts/Worker Activities Scale. Also published by Evaluative Research Associates, the Orientation to Career Concepts instrument includes a series of scales designed to measure career awareness of students in grades 4-8. Project CAP staff selected the Worker Activities Scale because it measures knowledge of what different workers do in various occupations that are representative of the 15 USOE career clusters. It is a 20-item scale; items are written in a five-response, multiple choice format. The reliability of the scale is evidenced by a reported internal consistency reliability coefficient of .76.

Credibility of Evidence

Evaluation design. Project CAP staff used a posttest only, matched control group model to evaluate the effectiveness of the project activities. To serve as control schools for the schools in the Boston Mountains Cooperative that participated in the project, six schools outside the Coop having no formal career education programs were selected. These schools were matched with the project schools with respect to: (a) school population; (b) number of teachers; (c) expenditures per ADA; (d) average daily attendance; (e) average assessed valuation; (f) geographic location; (g) socioeconomic factors; (h) curriculum; and (i) other contextual variables.

Evidence of comparability of treatment and control schools.

- Population of treatment and control schools

Project Schools: Population

School	Grade 1	2	3	4	5	6	7	8	Total
Elkins	34	34	30	43	49	22	44	50	306
Farmington	54	41	56	49	51	53	59	58	421
Greenland	23	27	32	29	38	45	45	47	286
Prairie Grove	88	76	71	80	67	71	56	58	567
St. Paul	28	27	44	21	28	30	20	35	233
West Fork	65	63	56	54	70	77	67	88	540
TOTAL	292	268	289	276	303	298	291	336	2353

Control Schools: Population

School	Grade 1	2	3	4	5	6	7	8	Total
Charleston	47	53	41	53	42	51	62	71	420
Deer	29	18	23	27	26	23	23	25	194
Eureka Springs	32	38	38	43	30	28	36	34	279
Green Forest	48	58	51	54	68	72	78	66	495
Pea Ridge	53	37	37	34	56	43	51	42	353
Yellville	55	41	54	54	45	55	50	57	411
TOTAL	264	245	244	265	267	272	300	295	2152

- The average number of teachers at the six treatment schools was 33.3; the average number of teachers at the six control schools was 30.3.

- Expenditure/ADA of treatment and control schools

Treatment Schools	Expenditure Per ADA	Control Schools	Expenditure Per ADA
Elkins	$795	Charleston	$712
Farmington	723	Deer	764
Greenland	838	Eureka Springs	1,013
Prairie Grove	755	Green Forest	756
St. Paul	884	Pea Ridge	719
West Fork	697	Yellville	736

- Average assessed valuation, ADA, and expenditure/ADA

	Average Assessed Valuation	Average ADA	Average Expenditure Per ADA
6 Treatment Schools	$3,583,285	604	$732.00
6 Control Schools	$3,798,705	581	783.50

- The six treatment and six control schools are geographically located in the rural, mountainous area of northwest Arkansas.

- Socioeconomic factors: the occupations of parents from the treatment and control school districts include limited farming, poultry raising, cattle raising, truck and orchard crops, logging, light industry, and service jobs.
- The curriculum of all twelve schools appears comparable, e.g., 9 of the twelve schools use the same reading series.
- The student populations from all twelve schools appear to have comparable exposure to media outside the school. All areas have access to a weekly county paper and in a few of the locations a daily newspaper. All areas can receive at least one clear network TV channel and an educational channel.

Data collection procedures. Students in the treatment and control schools were administered the CAT, the Career Knowledge Test, and the Orientation to Career Concepts/Worker Activities Scale in late February and March 1977. The instruments were administered by Project CAP staff after they had received special training in administering them, including practice in reading the questions orally to refine their pronunciation, pacing, and manner of administration. Project staff scored all student responses to the instruments. The project evaluator was responsible for all data analyses.

Evidence of impact

Data analyses. Mean posttest differences between treatment and control schools by grade level were analyzed using the t-test for independent samples. Tables 1, 2, and 3 below present the means, standard deviations, t-values, and significance levels for treatment and control schools on the Career Awareness Test (CAT), the Career Knowledge Test, and the Orientation to Career Concepts/Worker Activities Scale. The results presented in these tables demonstrate that the treatment schools invariably out-performed the control schools by a wide margin on the posttests. On all three instruments, at every grade level, group differences were highly significant.

Table 3

Career Awareness Test (CAT)

Grade Level	N	Mean	SD	t-value
1: Treatment	292	12.4	2.7	19.79**
1: Control	264	8.3	2.2	
2: Treatment	268	17.3	4.3	13.44**
2: Control	245	12.9	3.1	
3: Treatment	289	19.0	3.9	12.28**
3: Control	244	15.0	3.6	
4: Treatment	276	14.8	3.4	6.05**
4: Control	265	13.0	3.1	
5: Treatment	303	16.9	3.9	8.16**
5: Control	267	14.4	3.2	
6: Treatment	298	17.1	3.8	6.64**
6: Control	272	15.1	3.3	
7: Treatment	291	15.6	4.3	6.64**
7: Control	300	13.4	3.9	
8: Treatment	337	17.6	10.1	4.84**
8: Control	295	14.6	3.8	

**significant at the .001 level

Table 4

Career Knowledge Test

Grade Level	N	Mean	SD	t-value
1: Treatment	292	20.9	4.0	12.38**
1: Control	264	16.5	4.5	
2: Treatment	268	20.5	4.3	4.88**
2: Control	245	18.6	4.3	
3: Treatment	289	22.4	3.8	4.89**
3: Control	244	20.8	3.6	

**significant at the .001 level

Table 5

Orientation to Career Concepts: Worker Activities Scale

Grade Level	N	Mean	SD	t-value
4: Treatment	276	9.6	3.0	5.84**
4: Control	265	8.1	2.9	
5: Treatment	303	10.5	3.0	5.31**
5: Control	267	9.2	2.9	
6: Treatment	298	11.4	3.1	7.30**
6: Control	272	9.4	3.3	
7: Treatment	291	12.8	3.3	2.80*
7: Control	300	12.1	2.8	
8: Treatment	337	13.5	5.7	2.80*
8: Control	295	12.5	3.1	

**significant at the .001 level
*significant at the .005 level

Evidence that the effects are educationally meaningful

The evaluation plan used, the data collected and the resulting analyses provide reasonably convincing evidence that Project CAP produced educationally significant results. The treatment and control schools were equivalent on such variables as school population, school staff per student, district expenditure per ADA, average daily attendance, average assessed valuation, geographic location, socioeconomic factors, curriculum, and exposure to information outside the school. The use of comparable control schools appears to rule out the possibility of explaining the results in terms of other variables such as maturation effects, practice effects, and outside-school experiences. In addition, all mean differences between treatment and control schools exceeded one-third of a standard deviation; in fact, for grades 1-3 the treatment mean scores exceeded the control mean scores by more

than one standard deviation on the Career Awareness Test. The large sample that included grades 1-8 and the very high level of statistical significance attained across all grades indicate that the Project CAP goal of significantly increasing students' awareness of careers was achieved.

Evidence of generalizability to other populations

The high degree of stringency with which the evaluation was implemented and the exceptionally strong results provide reasonable assurance that the program is making substantial progress toward meeting the career awareness needs of local students. Those school districts with similar rural populations comprised predominantly of Caucasian students may consider adapting the Project CAP program to their local settings, knowing that the program has been demonstrated to be effective in its original locale.

AIR-66700-6/78-TR1(2)

DEVELOPMENTAL CAREER GUIDANCE PROJECT

Pima County, Arizona

A Submission to the
Joint Dissemination Review Panel

Susan L. McBain
Steven M. Jung
American Institutes for Research

30 June 1978

The information reported herein was obtained pursuant to contract no. 300-77-0303 with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to document information according to their observation and professional judgment. Consequently, information, points of view, or opinions stated do not necessarily represent official Office of Education position or policy.

PROGRAM AREA: CAREER EDUCATION

ACTIVITY TITLE, LOCATION: Developmental Career Guidance Project, Pima County, Arizona

DEVELOPED BY: Pima County, Arizona, Developmental Career Guidance Project

SOURCE AND LEVEL OF FUNDING:

1971-72:	$278,000	Arizona State Department of Education
1972-73:	500,000	Arizona State Department of Education
1973-74:	535,000	Arizona State Department of Education
1974-75:	560,135	Arizona State Department of Education
1974 :	10,000	Educational Professions Development Act

BRIEF DESCRIPTION OF ACTIVITY

The intervention is a set of activities across levels K-12, designed to help students develop knowledges and skills in the following areas: self-awareness and self-esteem; the world of work; and decision-making.

Goals

The goals of the Pima County Developmental Career Guidance Project are defined by the Arizona Career Education Matrix, developed and approved by the Arizona State Department of Education with the help of local district and school staffs. The matrix includes goal statements that are divided into seven categories. These categories are listed below along with example goal statements taken from four grade level groups (K-3 primary, 4-6 intermediate, 7-9 junior high, and 10-12 high school):

- Self-Awareness (junior high level): The students will consider their interests and aptitudes in exploring career information.
- Career Awareness (primary level): The students will become aware that people do different things at their work.
- Decision Making (intermediate level): The students will recognize the steps of the decision-making process.
- Employability Skills (high school level): The students will present an accurate description of education, training, experience, and information about themselves to potential employers through a variety of means such as interviews, tests, and application forms.
- Educational Awareness (junior high level): The students will understand the educational requirements needed for entry into occupations within selected career areas.
- Economic Awareness (primary level): The students will become familiar with the varied economic rewards gained from different kinds of work.
- Appreciations and Attitudes (high school level): The students, based on their tentative career choices, will analyze the interrelationship of work, continued learning, the arts, and leisure in achieving social responsibility and self-satisfaction.

Some of the seven categories are stressed more at one level than at others. In grades K-6, the building of self-awareness, self-esteem, and skill in decision-making is viewed as paramount, though awareness of career areas is not ignored. At the 7-9 level, occupational clusters are studied in more depth. Students are encouraged to examine their interests, continue developing their decision-making skills, and spend time thinking about and examining several potential career areas. At the 10-12 level, direct contact with selected career areas is provided, including

exposure to work, to workers, and to actual work experience.

Students' career development is influenced not only by what educators do, but also by what parents, employers, and community groups do. Therefore, the goals of Pima County's efforts also include increasing the involvement of these groups in career education and improving their effectiveness with students in whatever roles they may play.

Claims of Effectiveness

As a result of high levels of exposure to this career education program, a sample of students in grades 4-12 in the county performed better in all categories tested, as measured by a locally developed Careers Test, than did a comparable sample of students with low exposure to the program. The evidence presented to support this claim is from the school year 1974-75.

Description of Intervention Activities

The approach to career education in Pima County is often referred to as infusion. Infusion is not so much a change in the content of school subjects as in focus and intent. It involves the continual demonstration of the many relationships between school subjects and particular occupations, job clusters, or the world of work as a whole. For example, addition may be taught using restaurant checks in a simulated coffee shop instead of using blank paper. Because of the nature of infusion, and because of the wide array of career education resources that the Pima County project has made available for school staffs to choose among, the specific experiences that make up the program for any one student vary. A few examples may help the reader understand the nature of the program, but it should be remembered that these are representative examples, not universal student experiences.

Elementary level activities. Elementary level activities generally focus on self-awareness, self-esteem, and an introduction to jobs.

> Example: In one elementary school, a Care Center was instituted as a resource for all K-6 students. Records and record players, books, games, bulletin board materials, and other activities were available to help students learn about the two Themes of the Month, one concerning an occupational area and the other concerning an affective area. Example areas examined in one month were careers in the transportation cluster and problems in dealing with crisis situations (death, divorce, illness). Students used the Center both for class assignments and also independently to investigate careers and explore or express feelings. The Center staff, parent aides, or the school counselor were available at all times to work with students; also, students were encouraged to express their feelings in a Feelings Box, where they could insert notes telling their feelings and asking to talk to a staff member if they wished. The focus on each month's occupational cluster culminated in a full-day Career Day, with several speakers coming in to discuss their careers.

Junior high level activities. Activities at the 7-9 level focus on greater study of occupations and application of decision-making skills.

> Example: In one 8th grade class, a unit on occupations required students to complete a notebook consisting of values clarification, decision-making, and job exploration exercises. Examples of exercises were: (1) a values-appraisal exercise in which students rated (on a 1 to 10 scale) activities of importance to them individually; (2) a job interest exercise where students checked which of 10 activities under various job clusters they would rather perform; (3) an Occupational Study Guide asking students specific questions concerning the job(s) of their choice; (4) a data-

people-things exercise where students selected a response representing one of these preferences in 20 situations; (5) a jobs decision making exercise where students listed 10 careers of interest together with characteristics of each career (education required, whether it involved other people or not, risk factor, preferred size of organization, and other factors of the student's choice); (6) a What I Like About Me exercise where students chose which of 60 positive attributes described them; and (7) a Where I Want To Be Ladder where students forecasted which of their desires in life they might fulfill in five years or in their lifetimes.

Senior high level activities. Activities at the 10-12 levels are aimed at giving students actual exposure to work and work sites.

Example: A communications laboratory of one high school was the center of radio/TV/film/newspaper activities on campus. Students learned basic technical skills in one or more of these areas and then produced their own films, broadcasts, and newspaper. This involved covering campus and community activities, interviewing people on and off campus, visiting local TV and radio stations and newspapers to observe and participate in a real setting, and preparing original material (such as a videotaped spoof of television advertising).

These examples portray large-scale efforts which have been undertaken during the Pima County effort. However, smaller connections made day-to-day between school and work are even more common. The example given earlier of doing addition on restaurant checks rather than blank paper is illustrative.

Project staffing. Career education in the county is coordinated and facilitated by the Pima County Developmental Career Guidance Project. Project policies are set by an 11-person governing Board consisting of one official from each of 11 participating school districts, operating under an interjurisdictional agreement. The staff consists of four teams of persons working out of separate offices serving different county areas. The central office in Tucson is run by the project director and staffed by guidance specialists and support staff. The three area offices, each located in a small district outside of Tucson, are each headed by an assistant director and staffed by guidance specialists plus a small support staff.

Guidance specialists. The "front line" persons in the Pima County effort as implemented in 1974-75 were the project's guidance specialists. Persons chosen as guidance specialists generally had advanced degrees in counseling plus commitment to and enthusiasm for career education. In 1974-75 they were usually assigned three to four schools apiece, visiting each on a weekly basis. Numbering about 30 in that school year, guidance specialists were chiefly responsible for helping teachers and counselors infuse career education and career guidance activities into the classroom. Through workshops, in-service sessions, and individual consultation they strove to impart to teachers and counselors an understanding of Pima County goals of career education and the nature of the infusion process; to acquaint them with career education media and methods for their use; to help them plan the use of guest speakers, field trips, and other community resources; and to help them integrate guidance activities into the classroom. Often the guidance specialists conducted these activities themselves, particularly at the elementary level; in fact, the degree of project staff involvement directly in the classroom when compared to other infusion approaches to career education across the country is a significant feature of this project.

Staff relationships. Cooperation between the project staff and staffs of the 11 participating districts is another notable feature of this program. Districts offer support to the project in many ways, such as supplying space for offices and workshops and sharing salary costs of some staff members. In addition, the Board

distributes project funds in part on the basis of district needs instead of on a strict per-pupil basis, allowing smaller districts to maintain resources comparable to those maintained by larger districts.

Cooperation among groups involved in this project extends also to contacts between project staff and building staff. Project services are offered throughout the county, coordinated by the central office and three area offices. However, no school or teacher is required to use project services, and in fact project staff will not begin work in a school unless both the principal and a majority of the teachers request it. Use of project services has spread from six schools initially in 1971-72 to virtually all county schools in 1977-78. This appears to be because students, parents, teachers, and administrators have learned of the project's intriguing activities and impressive results in other schools and have asked for project staff involvement in their schools.

Community Resource Center. One of the project's major activities is its Community Resource Center, located at the central Tucson office. The three full-time Center staff members coordinate a wide range of contacts between the schools and the community, including guest speakers, parent volunteers, summer businessman/teacher seminars, and work exposure/experience sites for students. The Center's Community Resource Advisory Council consists of 18 community members who work with Center staff members to increase community involvement in career education. The effort has been aimed at including parents, community organizations, and all segments of the world of work as collaborators in education, who bring their own unique and varied contributions and viewpoints, not merely supplementers who do what educators tell them to do. Business and community group members act as speakers, resource persons, and work exposure/experience site hosts, under overall coordination by the Community Resource Center and its Advisory Council. In addition, these people participate in seminars and work exposure activities for teachers and counselors as part of the latter's in-service training.

Involvement of parents is a particular focus of the project through the Community Resource Center. Experiences offered at the Center include discussion groups on career education and on effective parenting, leadership training, and opportunities to participate in school activities as teacher aides, speakers, or resource persons. Project staff members are fully cognizant of the fact that parental expectations influence students' career selections substantially. Staff members work to increase participation in the on-going parent groups each year.

Career education media. Another major project resource is its extensive collection of career education media, located at all four offices and available to all county teachers and counselors. The project constantly maintains and updates an extensive library of career education media and materials for use by all Pima County teachers, including commercially published materials and 24 project-developed instructional units. Its Media Advisory Committee, made up of teachers, counselors, and project staff members representing different county areas, carefully screens all incoming materials for effectiveness and absence of race or sex bias; the Committee's recommendations are valuable for local school purchasing decisions as well as project decisions. These materials, speakers, and activity units have been available for all local school personnel to select from according to the needs of their students.

Inservice training. Inservice programs for teachers and counselors consist of regular one-hour after-school sessions conducted by guidance specialists, held at least once a month. Special sessions to help teachers and counselors develop or tailor materials to their students' needs are held whenever requested. In addition, special topic workshops are held several times a year county-wide or for individual districts, coordinated by the project's two staff development specialists. Teachers and counselors are also encouraged to take relevant college course work.

Context

Pima County is a highly diversified area, containing one of Arizona's major cities (Tucson) and also large stretches of farm land and Indian reservation land. Its population is about 80% white and 20% Mexican-American, American Indian, and other ethnic minorities. In general, whites tend to live in the urban portions and minorities tend to live in the more rural areas.

The county contains a total of 155 schools: 104 elementary schools, 34 junior high schools, and 17 senior high schools. The total number of students in the county is about 93,000.

Intended Users and Beneficiaries

The primary users and beneficiaries of the program are the K-12 students themselves. Project staff believe that students will benefit from the program by being enabled to better plan their school course work and activities around areas of career interest; to better develop post-high school plans best suited to their career aspirations; and, in the long run, to choose more appropriate careers and lead more satisfying lives than students without such experiences.

Subsidiary benefits are also believed to accrue to the school and community (including parents, teachers, and community group members) who become more familiar with each other's roles and more effective in their relationships to each other and to K-12 students.

Student Characteristics

The students in schools served by the Pima County project formed a cross-section of K-12 students county-wide. The student population was approximately 20% minority, primarily Mexican-American but also American Indian, Black, and other minorities. The students represented all socioeconomic levels and came from settings ranging from heavily urbanized (though no portion of Tucson could be characterized as "inner-city" in the usual sense) to extremely rural.

Salient Features

The central features of this effort are:

- its emphasis on refocusing the county's entire approach to education to demonstrate the relevance of education and work. To achieve this end, large numbers of activities are used and a wide array of career education resources for all levels is offered; and
- its use of specially trained guidance specialists who can keep abreast of career education resources and implementation methods.

Costs

The costs of adopting this program can be estimated from the costs of project operation in 1974-75. The breakdown of costs for 1974-75 is as follows:

Personnel	$403,924
Personnel training	2,000
Supplies and equipment	35,307
Consumables	3,200
Other (contractual services, travel, miscellaneous)	115,704
Total	$506,135

In 1974-75, about 75,000 students were served by project staff, resulting in a per pupil cost estimate of about $6.75.

EVIDENCE OF EFFECTIVENESS

Evaluator

Behavioral Research Associates of Tucson, Arizona, developed the student outcome instrument during 1972-73 and conducted formal evaluations of the program in subsequent years.

Interpretability of Measures

Behavioral Research Associates developed, pilot tested, and field tested a "Careers Test" to measure effectiveness of the program. In 1974-75, the test had two forms, an elementary-intermediate form for students in grades 4-7 and a secondary form for students at the 8-12 levels. In addition to questions seeking information about students' background and home environment, the 4-7 level test contained 49 items, while the 8-12 level test had 82 items.

Both forms of the Careers Test were paper-and-pencil instruments. Both covered the seven categories of the Arizona Career Education matrix already discussed (except for the employability skills category at the elementary level). In addition to scales in each of these areas, two other scales were included: a measure of cumulative knowledge in nine career clusters, and (at the secondary level) a measure of interest in those nine clusters. All category scores consist of percent of items answered correctly out of all items in that scale, so that a perfect score equals 100.

Validity and Reliability

Content validity has been verified by frequent review by state, county, project, and local district staff. Reliability of the test was estimated by correlation of test/retest scores of 100 students tested at each of the two levels with a two-to-three month separation between tests. Scores in the seven categories were correlated .70 to .90 from one administration to the next.

Credibility of Evidence

Behavioral Research Associates conducted two to three hours of training with each guidance specialist to make sure that test administration was standardized. All testing was conducted by the guidance specialists. Data were checked, analyzed, and interpreted by the evaluators.

Evidence of Impact

Evaluation design. The 1974-75 evaluation utilized a posttest only, treatment/control group design. The 1974-75 school year presented the last opportunity to find enough schools in the county to create a plausible control group. After that school year, most schools in the county were receiving project services. In February and early March of 1975, the guidance specialists used information from their weekly logs to assess the degree of implementation of career education in all district schools. Based on this information, schools were divided into high, medium, and low implementation groups. A strictly no-implementation group was precluded because constant teacher and principal transfers among county schools had left almost no "career education-free" schools. The 26 schools in the high implementation group contained the treatment population and the 25 schools in the low implementation group contained the control population. Approximately 10 percent of the county's schools received services tailored to non-English-speaking students who were heavily concentrated in rural areas. It should be noted that these schools were

not included in this study in either the treatment or the control group because of their special character.

Sample selection. Student sampling was done by random selection of intact classes. A list of all teachers' names from the high and low implementation schools was compiled. Student samples were constructed by randomly selecting fifty teachers' names in each group and designating their students as members of the treatment and control groups. Twenty-five teachers each were selected at the 4-7 level and the same number was selected at the 8-12 level. The total number of high-exposure students actually tested at the 4-7 level was about 550, with an equal number of low-exposure students tested; almost 700 high-exposure and 700 low-exposure students were tested at the 8-12 level.

The numbers of schools, teachers, and students actually participating in the evaluation are summarized in Table 1.

Table 1

Numbers of Schools, Teachers, and Students Participating in the Evaluation

	No. of Schools		No. of Classes		Total	Approximate No. of Students		Total
	Grades 4-7	Grades 8-12	Grades 4-7	Grades 8-12		Grades 4-7	Grades 8-12	
High Implementation Group	17	9	22	25	47	550	700	1,250
Low Implementation Group	17	8	23	25	48	550	700	1,250
Total	34	17	45	50	95	1,100	1,400	2,500

Comparability of samples. Tables 2 and 3 contain the results of analyses that were conducted to estimate the degree of comparability of the high and low exposure groups on dimensions other than amount of services received from the Pima County program staff.

Table 2

Characteristics of Teachers in Sampled Classes

	Average Teacher Age	Average Education	Average Teaching Experience	Ethnicity	Sex
High Implementation Group (N = 47)	33.9 yrs.	B.A. + 28.7 units	9.7 years	30% minority	41 female 6 male
Low Implementation Group (N = 48)	34.2 yrs.	B.A. + 29.1 units	9.8 years	27% minority	41 female 7 male

Table 3

Characteristics of Students in Sampled Classes

	Average School Reading Scores for Grade 4*	Average School Listening Scores for Grade 4*
High Implementation (N=16)	2.9	3.1
Low Implementation (N=17)	3.1	3.4

*Stanford Achievement Test administered to third graders in 1973-74. Scores reported in Grade Equivalents using publisher's norms.

These data suggest that the high and low exposure classes do not differ systematically on any educational dimensions likely to cause differences on the Careers Test.

Data analyses. T-tests were computed at each level (4-7 and 8-12) on each career education category of the Careers Test. Some categories were made up of sub-categories; in these cases, comparisons were done on the sub-categories instead of the total categories. Results are shown in Table 4. Calculated t-values are shown together with their significance levels (to .001 mininum). Student scores shown represent mean percentage of items correct on that category or sub-category. All comparisons at every grade level favored the high-exposure students; 19 of 20 comparisons favored the high-exposure students at the .001 level of significance, with the remaining comparison favoring them at the .02 level of significance.

The self-awareness category is not measured directly by the test. However, items in the 1974-75 test did measure student perceptions of: (1) their readiness for employment in each of the nine clusters; (2) self-perceived brightness in relationship to other students; (3) self-expectations for scholastic performance; and (4) differences in certainty of achieving educational and occupational aspirations. While these self-report data are rather "soft" in character, it is noteworthy that on every comparison made at each level, high-exposure students rated themselves higher than did low-exposure students, indicating a higher degree of self-confidence.

Evidence of Statistical Reliability of Effects

Data in Tables 2 and 3 demonstrate that neither teacher effects nor pre-existing differences in the student groups are likely explanations of the above results.

Further evidence is provided by test results obtained in subsequent years. In both 1975-76 and 1976-77, results continue to show the superiority of high-exposure students on the Careers Test. Even though low-exposure students were presumably receiving more career education as project activities increased over those years, the differences between groups remain impressive. In 1975-76, 19 of 20 comparisons favor the treatment group at the .05 level of significance. In 1976-77, 17 of the 20 comparisons favor the treatment group. Twenty-six of these 40 comparisons over the two years favor the treatment group at the .01 level or beyond.

Evidence that effects are educationally meaningful. The evaluation data developed and presented in 1974-75 consisted of numbers of students tested, mean percentages of items correct, t-ratios, and significance levels. At this writing, more detailed data are no longer available; therefore, size of differences between groups in standard deviation terms cannot be given. Educational significance is better judged instead on other factors. These are: (1) the importance of the seven categories; (2) the modest cost of implementing this program relative to the number of students served; and (3) the enthusiasm of project and school staff and members of the recipient communities. It is noteworthy that in at least 30 schools, school officials who were reluctant to make use of project services (because of concern for their overburdened teachers and other staff members, fears of increased costs, or simple resistance to change) were prodded into action by parents, teachers, and counselors. Such enthusiasm certainly demonstrates the program's perceived importance within the local community.

Table 4

Mean Percentage of Items Correct on the Careers Test, t-Ratios, and Significance Levels

	# of items	High Exposure Sample (N = 550)	Low Exposure Sample (N = 550)	t	Significance Level
Elementary/Intermediate Students (grades 4-7)					
Educational Awareness	5	51.8	48.9	2.17	<.020
Career Awareness: Knowledge of Skills Required	5	61.1	56.6	3.05	<.001
Career Awareness: Knowledge of Factors Contributing to Job Satisfaction	5	57.7	53.3	3.19	<.001
Career Awareness: Common Threads in Jobs	5	73.0	63.9	5.88	<.001
Economic Awareness	2	59.9	54.5	3.51	<.001
Decision Making	5	68.2	60.0	5.70	<.001
Appreciations and Attitudes	5	65.7	58.8	4.46	<.001
Knowledge of Career Clusters Score	9	57.4	48.3	6.69	<.001
Secondary Students (grades 8-12)		(N = 700)	(N = 700)		
Educational Awareness	4	53.7	42.0	6.42	<.001
Career Awareness: Knowledge of Skills Required	7	62.1	50.0	7.08	<.001
Career Awareness: Knowledge of Factors Contributing to Job Satisfaction	7	69.3	55.6	6.91	<.001
Career Awareness: Common Threads in Jobs	7	70.6	57.6	6.34	<.001
Economic Awareness: Economic Awareness	4	58.6	47.1	5.64	<.001
Economic Awareness: Awareness of Career Mobility	4	45.5	35.4	5.11	<.001
Economic Awareness: Awareness of Factors Influencing Occupational Structure	5	59.0	47.4	5.79	<.001
Decision Making	6	39.7	32.7	4.82	<.001
Employability Skills*	9	27.5	22.4	8.06	<.001
Appreciations and Attitudes	4	59.0	47.4	5.92	<.001
Knowledge of Career Clusters Score	9	43.0	31.6	7.19	<.001
Interest in Career Clusters Score**	9	25.7	24.0	3.86	<.001

*proportion of students indicating "very well prepared" for entering clusters
**proportion of students indicating "very interested" in entering clusters

Evidence that the effects are attributable to the intervention. It has already been shown that the high and low implementation groups were very similar on a number of dimensions that if dissimilar might have provided alternative explanations for the obtained, between-group differences. Additional evidence that the Pima program was responsible for differences in student performance lies in the fact that all schools in the high and low implementation groups were formally eligible to obtain project services. As mentioned earlier, this was due in part to the lack of a true "no-exposure" group with which to compare high-exposure students. But it also helped ensure that results were not due to systematic differences in schools whose staff volunteered to participate in the evaluation.

Evidence of generalizability to populations for which the intervention is intended. It can be confidently stated that this program is effective with a student population made up of approximately 80% white students and 20% Mexican-American, American Indian, and other minority students. The positive evidence of effectiveness presented for 1974-75, borne out by similar results found in later years but not reported here, supports the claim that this program would give excellent results when replicated with a similar group of students. Since evaluation results are reported only for grade levels 4-12, the evidence is not generalizable to grades K-3.

Appendix C

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